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ABSTRACT

Finance, management, and productivity are selected as foci for discussion and organization in setting research priorities for postsecondary education. A list of issues for research was generated at a conference of educational leaders. Proposed studies on these issues are described in terms of the research questions, problem situation and expected value of research, relevant previous and current research, and research guidance. Five themes of the projects are: the interrelationship of federal, state, and institutional control of higher education, institutional adjustment to declining budgets and enrollments, and to changing student interests; the relationship between higher education institutions and the needs and interests of clientele, especially those of minorities and women; the relationship between higher education and the needs and demands of society; and alternative systems, strategies, and procedures for the delivery of postsecondary education, and adaptation of such systems to student and societal needs. (SW)

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Finance, Productivity, and Management In Postsecondary Education

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Selected Research Topics

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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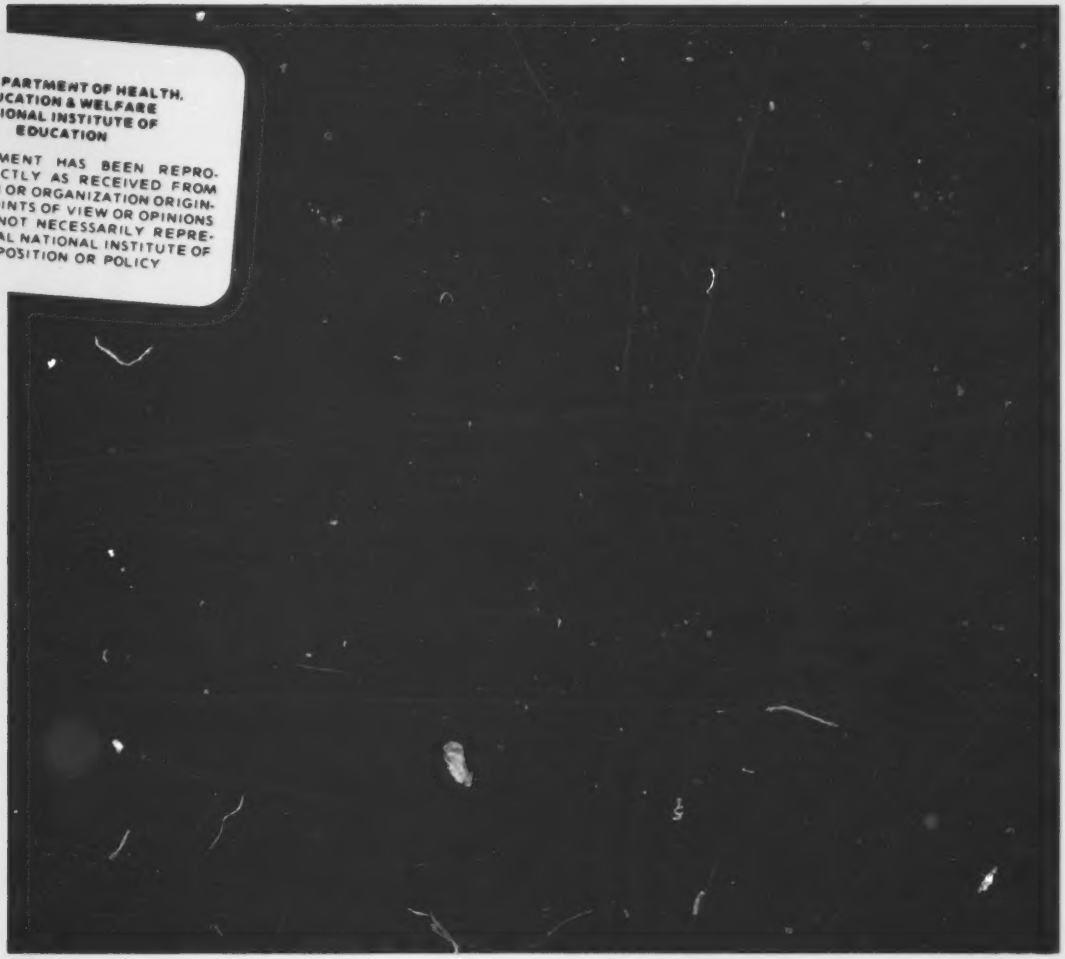

The National Institute of Education
U.S. Department of Health, Education and Welfare
Washington, D.C. 20208

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Finance, Productivity, and Management In Postsecondary Education

Selected Research Topics

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
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Preface

The mission of the National Institute of Education (NIE) is to support research critical to the well-being and improvement of education in the United States. Performance of this mission requires three steps:

(1) identification of needed research;

(2) contract of such research to responsible individuals and organizations; and

(3) publication and dissemination of findings.

Over the last year and a half, the National Institute of Education has attempted to develop research priorities in areas which have major impact on the survival and vitality of American colleges and universities. In designing the scope of our initial efforts, it was decided to concentrate on three interlocking areas of postsecondary education—finance, management, and productivity.

Identifying priorities is always a difficult problem. For research, one approach is to solicit from users themselves—the education community—problems and needs amenable to scientific study. Following this approach, the Institute convened a group of postsecondary education specialists at Keystone, Colorado. The primary purpose of the conference was to elicit a preliminary list of issues which could be elaborated upon in terms of relative importance and resolution through research. The conference was attended by educational leaders representing scholars and practitioners from colleges and universities, research institutions, State and Federal agencies, and professional associations.

The first day of the conference was devoted to identifying a broad range of educational issues. Discussion was conducted in small groups with considerable debate. More than 120 issues were identified and a group of 50 selected by vote as most important. On the second day, participants discussed ways in which the issues were interrelated and grouped them into several categories. Although many of the issues chosen are widely recognized, and certainly some important ones not included, the conference did provide a highly informed assessment of the range of priority needs for research.

Following the conference, three participants were selected to develop, refine, and focus sharply on each of the 50 issues and to identify specific research projects within the topics: Stephen A. Hoenack, University of Minnesota, for finance; George Weathersby, Harvard Graduate School of Education, for productivity; and Donald C. Lelong, University of Michigan, for management. The papers of these specialists were reviewed by a group of conferees and constitute the text of this, the final set of research topics.

These selected topics will serve a number of purposes. Foremost, they will alert the research community to questions to be addressed. Secondly, bringing projects to the attention of research-sponsoring agencies and foundations may stimulate additional support of these concerns. Third, NIE and the other funding organizations may benefit by drawing upon the listing as a guide in scheduling research.

Some of the projects identified are already supported by NIE. In addition, the Institute is considering initiating grants or contract competition to seek imaginative and thoughtful proposals from the research community on the problems identified. Given the priority-setting process employed, the high quality and diversity of the conferees, the importance of the subject matter, and the limits of NIE's budget, the Institute will actively encourage other public and private funding. It is hoped that the resulting research will yield both immediate solutions to some of the problems and substantive new directions for further investigation.

Five Recurring Themes

The topics of finance, productivity, and management were valuable as foci for discussion and organization during the priority-setting process. They were chosen and have been viewed with full knowledge that they do not represent discrete functional areas in higher education. There are, therefore, a number of important cross-cutting themes appearing throughout the project list.

At least five themes are identified.

The interrelationship of Federal, State, and institutional control of higher education.

Most of the proposed research studies on this theme would make policy more informed and sensitive. Examples are studies which deal with the interrelationship of Federal, State and institutional policies:

- Study of the institutional administrative costs associated with compliance with Federal reporting requirements.
- Study of the information used by public policymakers in decisions about supporting postsecondary education, and of the sources of information judged valid and reliable by policymakers.
- Study of the interdependence of Federal and State funding decisions by analysis of the effects of Federal financing programs and policies on State decisions regarding education support.

Institutional adjustment to declining budgets and enrollments, and to changing student interests.

Among the proposals which address the issues of coping with changing demands and needs are:

- Study of the legislative funding response to changes in enrollment resulting from a cost-related tuition policy.
- Study of the cost/effectiveness of alternative arrangements of curricula.
- Study of extant management strategies for coping with fiscal and student changes resulting from limited resources and external pressures.

The relationship between higher education institutions and the needs and interests of clientele, especially those of minorities and women.

Studies proposed which speak to this concern are:

- Study of the intergenerational effects of alternative student assistance programs on the life chances and social mobility of target populations.
- Study of factors influencing student choices to attend college, and of the information needs not being met.

The relationship between higher education and the needs and demands of the society.

Some of the proposed studies treat the changing role of higher education institutions as a response to changing social expectations:

- Study of the similarities and differences between the preferences of the general public for postsecondary education and the preferences of the educational community itself.
- Measurement of the effects and "outcomes" of the higher education experience relative to societal needs.

Alternative systems, strategies, and procedures for the delivery of postsecondary education, and adaptation of such systems to student and societal needs.

Among the studies proposed which respond to long and short term changes in the system are:

- Study of how decisionmakers may be persuaded to use new and improved measures of educational productivity.
- Study of the implications and effectiveness of alternative approaches to management resulting from continuing demands for accountability, for increased use of information systems and management tools, and to greater marketing activity in higher education.

These are among the more important problems and themes raised in the project list. In the sections which follow the studies cited above, together with other studies comprising the total set of research topics, are presented in detail. Each study description is organized under the following headings:

(a) Research questions.
(b) Problem situation and expected value of research.
(c) Relevant previous and current research.
(d) Research guidance.

Keystone Conference Participants

Peter H. Armacost, *Ottawa (Kan.) University*
Bert Biles, *Kansas State University*
David W. Breneman, *Brookings Institution*
Wilbur Cohen, *University of Michigan*
Stephen P. Dresch, *Institute of Demographic and Economic Studies*
Nolen M. Ellison, *Cuyahoga Community College*
Harold L. Enarson, *Ohio State University*
John Folger, *Education Commission of the States*
Joseph Froomkin, *Educational Policy Research Center*
Richard D. Gibb, *Indiana Commission for Higher Education*
Betty Giuliani, *Michigan State University*
Kent Halstead, *National Institute of Education*
Lee Hansen, *University of Wisconsin*
Eric Hanushek, *Yale University*
Stephen A. Hoenack, *University of Minnesota*
Hans H. Jenny, *The College of Wooster*
Martin A. Kramer, *Department of Health, Education, and Welfare*
Ben Lawrence, *National Center for Higher Education Management Systems*
Donald C. Lelong, *University of Michigan*
John D. Millett, *Academy for Educational Development*
Arthur Melmed, *National Institute of Education*
Frank Newman, *University of Rhode Island*
Ron Sapp, *Johns Hopkins University*
Charles Saunders, *American Council on Education*
Judith Segal, *National Institute of Education*
Lewis C. Solmon, *Higher Education Research Institute*
George Weathersby, *Harvard Graduate School of Education*
John Wilson, *Bank of America*

The conference was conducted by the National Center for High Education Management Systems

Contents

Finance Issues

Steven A. Hoenack

		Page
1.	Incentives and Disincentives For Financing Postsecondary Education Arising From The Multiple Nature of Sources	1
2.	Interaction of Postsecondary Demand and Supply	2
3.	Impacts of Current Financing Methods	4
4.	Economic Burdens Imposed By Federal Programs	6
5.	Alternative Methods and Choices In The Allocation of Educational Subsidies	7
6.	Demand For Continuing Education and Institutional Incentives to Provide Such Programs	9
7.	Effects of Tuition Pricing Policies On Institutional Survival	10
8.	Enrollment and Cost Analysis of Campus Closings	12
9.	Indicators of Financial Stress In Postsecondary Education Institutions	14
	Bibliography	16

Contents

Productivity Issues George B. Weathersby

	Page
1. Theories and Measures of Learning	21
2. Information for Student Choices	22
3. Increased Productivity Through Structural Change	23
4. Effective Use of Information In Public Educational Policy	25
5. Role of Postsecondary Education In Meeting Societal Needs	26
6. Student and Institutional Outcome Measures	27
7. Internal Pricing and Incentive Experiments	28
8. Alternative Measures of Productivity	29
Bibliography	31

Contents

Management Issues — Donald C. Lelong / R. Sue Mims

		Page
1.	Examination of the Decisionmaking Hierarchy In Postsecondary Education	33
2.	Better Means of Coordinating Short Range Budgeting With Long Range Planning	35
3.	Effects of Federal Financing Programs and Policies On State Decisions Regarding Postsecondary Education	37
4.	The Extent to Which Federal Programs Accomplish Their Objectives	38
5.	Analysis of Management Functions and Organizational Structures In Postsecondary Education	40
6.	Management Strategies For Coping With Changing Demands and Needs	41
7.	Effects of Existing Financing Constraints and Incentives On Management Options	43
8.	Implications For Management of Current Relationships Between Postsecondary Education and The General Public	44
9.	Development of Common-Core Data For Decisionmaking, and Indicators That Will Identify the Status of an Institution, The Trends Within It, and Trends In External Influencing Factors	45
10.	Information Needed For Federal and State Planning	48
11.	Information For Managers On Public Attitudes Toward Secondary Education	50
	Bibliography	52

FINANCE ISSUES

1. INCENTIVES AND DISINCENTIVES FOR FINANCING POSTSECONDARY EDUCATION ARISING FROM THE MULTIPLE NATURE OF SUPPORT SOURCES

Research Questions/Hypotheses

(1) What are the effects of Federal aid to States, institutions, students, and for research, on State government support of higher education?

(2) What are the effects of Federal research grants on private donor gifts & grants to institutions?

(3) What are the effects of State expenditures on public institutions on tuition charges and enrollments in both the public and private sectors?

(4) How are State expenditures on public institutions affected by enrollment demand for private institutions and private gifts to private institutions?

Problem Situation and Expected Value of Research

Higher education has many supporters, including the Federal and State governments, private donors, and students and their families. To the extent that the various supporters' expenditures influence each other, the expenditures of any one supporter can displace or enhance the expenditures of others. Federal and State policymakers could be better informed on how to handle the negative aspects of this situation if they understood how this interdependent behavior took place. For example, there may be interest in governmental subsidy proposals which stimulate rather than displace private expenditures on higher education.

Relevant Previous and Current Research

With the exception of the work of Clotfelter (1976) and Peltzman (1973), available research does not treat the behavior of higher education's diverse supporters as being jointly determined in the same model.

There is substantial research on the donations of individuals in response to Federal tax policy. (Feldstein (1975a-c, 1976), Feldstein and Clotfelter (1976), Feldstein and Taylor (1977), Levi (1975), Kirkwood and Mundel (1975), Reece (1977) and McNess (1973)). Feldstein's work provides estimates of the demand for giving to educational institutions[1] when the price of giving is influenced by tax laws. There is some research on corporate giving (Schwartz (1968) and Vasquez (1977)).

There is also substantial research on the theory and estimation of expenditure functions of State and local governments in response to Federal incentives and other variables. Theoretical work includes Bergstrom and Goodman (1973), Borcherding and Deacon (1972), James (1973), Maxwell (1972), McGuire (1973) and Wilde (1968). Empirical work not specifically directed to higher education but employing relevant methodology was reviewed by Gramlich (1970). Some of the notable work since 1970 includes Auld (1976), Barth, Bennett and Kraft (1976), Booms and Hu (1971), Denzau (1975), Gramlich (1972), Gramlich and Galper (1973), Hardy (1976), Pashigan (1974), O'Brien (1971), Strauss (1974), and Tresch (1974).

The studies by Clotfelter and Peltzman are of particular interest. Clotfelter's study provides esti-

[1] Contributions to elementary and secondary education are lumped with contributions to higher education in these studies.

mates of how State and local spending on higher education is influenced by private enrollment demand and vice versa. Peltzman's study provides estimates of a model in which total expenditures of public higher education institutions are influenced by expenditures[2] of private institutions and vice versa.

Kirschling and Postweiler (1971), Kirschling and Weldon (1975), and Lawrence and Kirschling (1974) have advanced and analyzed proposals for Federal grants to States in relation to the States' support for higher education, emphasizing the need for estimates of State response to Federal incentives.

Research Guidance

The basic choice is whether to continue to analyze the behavior of each supporter of higher education separately, or to develop models in which the behavior of several supporters is jointly determined. In either case, further work is needed on the following:

(1) The formulation of State government expenditures on higher education as a function of Federal student aid and research grants.

(2) Separate analysis of institutional incomes such as private gifts, tuition, and State governmental support. The Clotfelter and Peltzman studies address total incomes; a breakdown of these incomes by source is needed.

(3) The behavior of institutions in the use of funds and how this behavior influences supporters. For example: Federal research funding is influenced by institutional behavior; State expenditures may in turn be influenced by Federal funding.

Researchers should establish a cross-section model using State data to determine the mutually interdependent behaviors of Federal and State governments in subsidizing higher education, private benefactors in giving to institutions, and potential students in their enrollment decisions. Without such a simultaneous system, estimated relationships may not be attributable to the behavior of particular supporters. The Clotfelter and Peltzman studies have made progress in the estimation of a simultaneous model and strongly suggest that such a model is feasible. Most equations not estimated in either of these two studies have been estimated individually in other studies. Equations for institutions, showing responses to enrollment demands and the behavior of donors, are the only equations in the model which have not been estimated previously. A theory of institutional behavior adequate to specify these equations would be a task of the research project.

2. INTERACTION OF POSTSECONDARY DEMAND AND SUPPLY

Research Questions/Hypotheses

(1) What are the effects of alternative levels of tuition and financial aid offered by public institutions on enrollment demand for private institutions?

(2) What are the effects of measurable quality differences between public and private institutions on enrollment demand for public and private institutions?

(3) What are the effects of enrollment demand on admissions, financial aid and tuition, and the quality of instruction in private institutions?

(4) What are the effects of measures of competition on costs and measurable quality in public and private institutions?

[2] The expenditure data include governmental subsidies and tuition revenues and gifts but exclude Federal research grants.

Problem Situation and Expected Value of Research

As enrollments decline in the 1980's, institutional competition will change the character of many institutions and will force some institutions to close. Private institutions will be particularly affected because, relative to public institutions, larger fractions of their budgets are provided by tuition. Increasing aid to students and hence improving their opportunities to attend expensive institutions is one policy which would tend to equalize the capability of public and private institutions to compete for students. However, there is little analytical basis for forecasting how public and private institutions would react to greater student buying power. Would private institutions enroll significantly more students, or would the increased demand lead them to increase selectivity and tuition charges?

Another issue is the hypothesis advanced by Clurman (1969) that institutional competition under a dual tuition system will always produce "stress" because private institutions use their higher costs, which in this hypothesis translate into superior quality, in order to compete. This important hypothesis should be tested.

Relevant Previous and Current Research

There appear to be few theoretical analyses of behavior within institutions which provide testable hypotheses bearing on the issues described. Some theoretical work on institutional behavior has been done by Abowd (1977), Breneman (1970), and Levy (1968). Bowen (1968, 1969) has dealt with the problems of private universities resulting from absence of productivity growth. A thoughtful discussion of likely problems of private institutions during the overall enrollment decline in the 1980's is presented in Froomkin (1975). An important study of how competition for students has affected the quality of enrollments in private institutions is provided by Anderson (1975). Some theoretical work on college admissions appears in Johnson and Holzman (1975).

Enrollment demand studies which have particularly focused on choices among public and private institutions are Hight (1975), Corazzini et al. (1972), Kohn, Manski and Mundel (1976), Radner and Miller (1975), Jackson (1975), McPherson (1977), and Wagner and Rice (1977). The latter five studies have dealt thoughtfully with the application and admission process; however, they have not explicitly formulated and tested hypotheses about the causal determinants of the institutional behavior determining admissions, tuition, and financial aid. The Wagner and Rice study provides some theoretical discussion of institutional behavior in relation to admissions and financial aid.[3]

A major study by Abowd (1977) of the interaction between students and institutions in jointly determining the heterogeneity of institutions is based on theoretical work of Rosen (1974). This study represents a substantial methodological improvement over previous work.

Research Guidance

The most needed research is the development and testing of a theory of institutional behavior providing hypotheses about the effects of competition on public and private institutions under varying State subsidies divided between aid for public institutions and student aid. The hypotheses should include impacts on institutional costs, admissions, tuition, and grants-in-aid to students. The testing of the theory could incorporate the behavior of public institutions

[3] In some discussions and studies of financial aid there seems to be a misconception that the types of financial aid offered to students by an institution should be based on empirical studies of enrollment responses to alternative types of aid. Any such study would tend to average individual responses. An institution would maximize the enrollments of desired students (subject to their budget constraints) by allowing each student to choose among alternative types of aid at a given cost to the institution.

and State governments and the behavior of private institutions; or, it may be possible for it to deal with only private, non-research institutions. In the latter case, it may be possible to sample few enough private institutions in each State to be able to disregard the behavior of public institutions and State governments.[4] The behavior of major private research institutions would probably be omitted on the grounds that each can influence the behavior of State government and comparable public institutions. Also, theoretical work on the behavior of large research institutions is less likely to be tractable than for non-research institutions.

The project could be designed to incorporate significant research on student behavior; or, it could incorporate student behavior only insofar as necessary to ensure that the relationships representing institutional behavior could be estimated. In the former case, the researchers could help improve understanding about interactions between students and institutions wherein the number and quality of admissions, aid award, and matriculation, are determined.

3. IMPACTS OF CURRENT FINANCING METHODS

Research Questions/Hypotheses

(1) What are the effects of existing and alternative proposed student aid and tuition levels on the lifetime incomes of graduates relative to the lifetime income of their parents?

(2) Are there other identifiable and measurable intergenerational effects of higher education subsidies?

Problem Situation and Expected Value of Research

One of the most frequently discussed objectives of subsidies to higher education is the improvement of social mobility, particularly the upward mobility of the children of low-income parents. Given the importance of this objective, two questions arise. First, do existing subsidies actually improve social mobility? Second, what impacts would alternative subsidy proposals have on social mobility? In order to answer these questions it is necessary to measure:

(1) The effects of existing and possible subsidy schemes on enrollments by income group and the effects of the resulting schooling on the future earnings of children in each parental income group.

(2) The cost burden, including tax costs of the schooling among the children in each generation's income group.

These measures are not yet available. Hansen and Weisbrod's (1969ab) research, which was instrumental in directing attention to these issues, shows that existing subsidies provide more benefits in relation to tax costs for higher income families than they do for lower income families. This finding underlines the need to examine the effects of present and alternative subsidy policies on social mobility.

Relevant Previous and Current Research

Issues and estimation problems in the analysis of intergenerational effects of higher education are discussed in Dresch (1977) and other sources. Hartman (1972) has empirically analyzed the effects of higher education subsidies on income distributions. Recently, Conlisk (1977) has provided a formal

[4] In this case, it would be assumed that the sampled private institutions do not perceptibly affect the behavior of public institutions, directly or indirectly, through the State government. Therefore, there would be no institutions in the sample from some small States that have few institutions of any kind. This assumption would not be valid when variables for individual private institutions actually reflect the behavior of all private institutions.

model for intergenerational benefits of higher education. Estimates of the parameters of this model would make it possible both to evaluate the effects of existing subsidy systems on social mobility and to simulate the effects on social mobility of a wide variety of alternative subsidy systems. Other papers by Conlisk concerning this modeling approach are (1974ab, 1975).

Estimation of the parameters of a model similar to Conlisk's requires three types of information:

(1) *Matched Parent-Child Data.* There are two ways to obtain data on matched parent-child lifetime incomes, both from the National Longitudinal Surveys (NLS). The NLS data are described in *Career Thresholds* (1970, 1971ab, 1974, 1975). First, the NLS surveys of males aged 45-59 and females aged 30-44 in 1966 contain data on education and lifetime incomes of each sampled individual; education and occupation data from which lifetime income data can be constructed are provided for the parents of each sampled individual. Second, there are approximately 800 records in the NLS survey of males aged 45 to 59 in 1966 matched with their sons who were in the NLS survey of males aged 14 to 24 in 1966. Research on education and intergenerational wealth based on the matched records has been done by Parsons (1975). The matched data have the advantages of providing detailed information on both father and son and the possibility of allowing the analysis of returns to more recent education. These data have the disadvantages of small sample size, short earnings profiles for the sons (aged 25 to 35 in 1977), and the absence of information on females.

(2) *Estimates of the Effects of Subsidies on Enrollments.* Existing research on the demand for higher education is listed in Topic 5, "Alternative Methods and Choices in the Allocation of Educational Subsidies."

(3) *Estimates of Effects of Schooling on Income and Other Benefits.* Two studies which deal with problems in estimating effects of schooling on income is provided by Griliches (1977) and Taubman (1976). See Sewell and Hauser (1975) for research on other benefits of schooling.

A considerable amount of research on sampling problems in dealing with the NLS data and data similar to them has already been done. See, for example, the *Career Thresholds* and Sewell and Hauser cited previously.

Research Guidance

There appear to be two approaches to research on the intergenerational effects of the financing of higher education. One is to provide further research on components of a model such as Conlisk's. The other is to estimate and solve such a model. The latter alternative is likely to be the more fruitful.

There are variants on how Conlisk's model, or one similar to it, could be estimated. One alternative would be to attempt to include the estimation of the sensitivity of enrollments to subsidies and of the effects of schooling on income, as part of the estimation of the model. The alternative would be to incorporate previously estimated values for these relationships into a less ambitious model to be estimated. It would probably be preferable to take the latter alternative.

The estimation of a model similar to Conlisk's would require further theoretical work, particularly in regard to the functional form and specification of additional independent variables, including those associated with changing intergenerational labor market conditions and the characterization of the income distribution in Conlisk's model. Also, Conlisk's model needs to be adapted for estimation. Simplifying assumptions (e.g. linearity and the description of families) must be relaxed and the necessary computations and approximations made. The descriptive statistics of the income distribution function must be modified to account for the skewed

nature of actual income distributions. A procedure for simulating the effects of alternative values of those relationships must be designed. Finally, financing arrangements and wealth transfers need to be incorporated into the model.

4. ECONOMIC BURDENS IMPOSED BY FEDERAL PROGRAMS

Research Questions/Hypotheses

(1) What are the institutional administrative costs of Federal research grants, classified by granting agency and broad category of discipline?

(2) What are the institutional administrative costs of compliance with Federal reporting requirements, by major program?

(3) How can an improved general understanding of the role and costs of university administration be developed?

Problem Situation and Expected Value of Research

The Federal Government funds a substantial amount of research by staff members at colleges and universities. The costs to these institutions of performing federally sponsored research include not only the resources directly involved in the research, such as the time of research staff, but also indirectly involved resources including administrative support. The indirect costs are not easily attributable to Federal research projects because administrative support is allocable to many other institutional activities. The result is that an institution's overhead charges for research grants are frequently difficult to determine in an agreed-upon way and become a source of conflict with Federal agencies. Furthermore, because overhead charges within an institution are ordinarily not differentiated according to each research project's actual costs, possibilities for wasteful allocation of research support resources are created within the institution.

Colleges and universities have other unknown administrative costs resulting from Federal reporting requirements on matters such as affirmative action, student aid, and compliance with OSHA regulations. If these costs were known, appropriate charges could be made to the Federal Government which would encourage Congress and Federal agencies to weigh the value of information and regulation against the costs imposed.

Relevant Previous and Current Research

There is a substantial literature on cost analysis in higher education. (See for example, the recent survey of this literature by Adams, Hankins and Schroeder (1977)). However, almost all of the existing studies are concerned with the measurement of costs regardless of source. Very few studies attempt to estimate the separate effects of specific workloads on institutional costs. One such study, Verry and Davies' (1976) work on British universities, is important, but it does not deal with costs associated with sponsored research. Although there are some studies that arbitrarily allocate costs, such as Haywood (1976), those described in Powell and Lamson (1972), and Van Alstyne and Coldren (1976), few specifically analyze the institutional costs of Federal research grants or reporting requirements.

Research Guidance

An appropriate research design would include developing a theory of the role of administration in university production from which cost functions for several administrative activities could be derived. The cost functions would relate variable administrative costs to levels of all major university activities, including Federal research activities and Federal reports. Appropriate measures of the various activities would be determined. The sample of uni-

versities would have to be large enough to include different levels of Federal research activities in several categories of disciplines and professions, and different numbers of programs about which Federal reports are required. In this regard, the sample should include institutions with minimal Federal research funding to make the concept of variable administrative costs of Federal grants as broad as possible.[5]

The researchers should attempt the difficult task of taking into account the effects of Federal research activities on costs of instruction and other costs, as well as the more straightforward administrative costs associated with Federal research activities and Federal reporting requirements. The focus of the project should be restricted to administrative costs because the interrelation of nonsponsored research and instruction, and the difficulty of measuring levels of resources devoted to these activities, would probably preclude estimating these nonadministrative costs and determining how Federal research activities affect them.

5. ALTERNATIVE METHODS AND CHOICES IN THE ALLOCATION OF EDUCATIONAL SUBSIDIES

Research Questions/Hypotheses

(1) How can existing data on enrollments and subsidies, studies of enrollment demand, and studies of rates of return to education be made more useful in the evaluation of alternative choices in the allocation of educational subsidies?

(2) What further research on enrollment demand and rates of return is needed for the evaluation of educational policy alternatives?

Problem Situation and Expected Value of Research

There is an uneven allocation of subsidies among students having equal enrollment responses to the subsidies plus equal rates of return to their education or equal goals of socioeconomic mobility.[6] However, in spite of substantial research on the demand for—and rates of return to—higher education and other forms of training, policymakers do not have readily available information to guide them on the allocation of subsidies to improve efficiency or mobility. Demand or rate or return studies are usually performed in response to particular issues taken in isolation from others. As a result, some fields of study and categories of students have been studied intensively while others have not been studied at all.

Relevant Previous and Current Research

(1) *Rates of return and the Demand for Higher Education.* There is a substantial literature on the rates of return to schooling, combined with an awareness of analytical issues in the calculation and interpretation of rates of return. These issues are discussed by Blaug (1976), Dresch (1975b), Griliches (1977) and Mincer (1970). Existing research on the effects of subsidies on the demand for higher education is reviewed by Jackson and Weathersby (1975), Radner and Miller (1975), and Weinschrott (1977). More recent work includes that of Carroll and Relles (1975), Carroll, Mori, Relles

[5] An alternative research design would be a direct observation and costing approach. Such an approach would be more ambiguous than the estimation approach in the allocation of costs to federally related activities that are arguably allocable to other activities.

[6] Two characteristics of the financing of higher education are particularly responsible for uneven subsidies. First, many higher education subsidies are provided by the States, which differ in the importance they attach to higher education in relation to other goods and services. Second, most subsidies are restricted to use for attendance at colleges and universities, more often public than private; and they ordinarily cannot be applied to on-the-job training, investment in a business, etc.

and Weinschrott (1977), Jackson (1977), Dresch (1975a), McPherson (1977), and Wagner (1977). Freeman (1971, 1972, 1075a-c) has done considerable research on the effects of labor markets on the demand for higher education.

(2) *Planning Models and Data Bases.* Huckfeldt (1973) and the National Commission on the Financing of Postsecondary Education (1973) have proposed national planning models; however, neither has specified descriptions of existing subsidies, effects of alternative enrollment subsidies, or how the enrollment changes would be related to goals for efficiency or socioeconomic mobility. Dresch (1975a) proposed a data base in which successive cohorts of high school graduates would be followed, "examining the relationship between their labor market and educational perceptions, on the one hand, and their educational decisions, on the other . . ." An institutional model incorporating enrollment demand functions, institutional costs, data on eligible high school graduates in different income groups, and objectives related to access is provided in Hoenack (1971). A similar model employing national data is provided in Bishop (1975).

Research Guidance

A flexible planning tool could be designed in which existing data could be maintained in rapid retrieval form, cross-tabulated for use in a variety of policy deliberations. Data on enrollment and the populations from which enrollments come, estimates of enrollment responses to subsidies, rates of return, and records of Federal or other subsidies, would be readily available. For example, the planning tool would permit calculations appropriate to analyses of issues, such as the effects of dependency status on the ability of the Basic Opportunity Grant program to improve access (see Hansen and Lampman (1974)) and the socioeconomic distribution of enrollments among institutions classified by selectivity (see Astin (1975)). The planning tool could permit, within the limits of existing research, calculation of the efficiency and access effects of alternative allocations of subsidies. It would help focus attention on the relative importance of alternative costly research projects: choosing between additional research on relative rates of return on vocational college attendance, versus on-the-job training; or, additional research on relative rates of return to training in different graduate professional fields.

Continuing work on this research project would include the regular alteration of aggregation categories in the data base, estimated enrollment responses to subsidies, and calculated rates of return, in response to policymaking interests and new research. Uses of the planning tool would direct attention to acute needs for additional research. The research project would include substantial consultation with both policymakers and researchers to ensure its continuing usefulness.

The planning tool could be designed to be consistent with the Huckfeldt and Dresch proposals. If there should be a national planning model, the proposed research could increase the likelihood of its begin focused on the important issues. It could also help in the research design for Dresch's proposal for a data base on successive cohorts of students.

There would be at least six components of the research project:

(1) A formal procedure for involving policymakers and research personnel in the initiation and continuation of the research project would be designed.

(2) The relevant portions of available enrollment and population data bases would be determined.

(3) Available data on existing subsidies would be collected and interpreted and identified with the records in the research project data base on enrollments and populations.

(4) Existing research on responses of enrollments to subsidies—and on rates of return—would be evaluated, classified, and placed in the data base.

(5) The computer programs for cross-classifying the data base for particular policy problems would be written.

(6) A recommendation for regularly updating the data base with new research and regularly presenting reports to policymakers would be prepared.

6. DEMAND FOR CONTINUING EDUCATION AND INSTITUTIONAL INCENTIVES TO PROVIDE SUCH PROGRAMS

Research Questions/Hypotheses

(1) How do students respond to efforts by institutions to recruit them into continuing education programs?

(2) How can academic personnel provide continuing education programs that are fiscally sound and compatible with other academic activities?

Problem Situation and Expected Value of Research

The expansion of continuing education activities is seen as a way for many colleges and universities to offset the effects of declining enrollments from the traditional college age group of the population. Because substantial layoffs of faculties during the 1980's are possible, the interest in continuing education is intense. Continuing education activities in professional fields have been highly successful at many colleges and universities (see *Forbes Magazine* (1977)). However, little is known about the demand or supply of continuing education in traditional academic fields. There is a need for information about the response of the demand for continuing education relative to institutions' efforts to expand it. There is an equally strong need for understanding how to create incentives and the means for academic personnel to develop continuing education programs which are both financially successful and compatible with other academic activities and interests.

Relevant Previous and Current Research

Bishop and VanDyk (1977) have performed an econometric study of the demand for continuing education using cross-section data for metropolitan areas. Becker (1975), Dunworth and Cook (1976), Hoenack and Norman (1974), and Hoenack (1977) provide hypotheses of the effects of instructional and other incentives on faculty behavior and describe mechanisms for creating incentives. However, there are apparently no empirical studies available on the effects of instructional or other incentives on faculty behavior.

Research Guidance

Further empirical work on the demand for continuing education could be performed. For institutions that have had continuing education programs for some time, time series estimates of the demand for continuing education as a function of tuition, income, labor market variables, composition of the local population, and availability of programs could be performed. A market research study of the potential clienteles for various types of new continuing education programs would help institutions decide on the types of new programs they should offer and

how to tailor the curricula to client needs. The value of either type of study is limited, however, because of the need for information about the supply of continuing education in response to incentives and about how demand would respond to changes in the quality of supply. Existing continuing education programs are small in relation to what they might become as part of institutions' attempts to help offset the enrollment declines caused by the decreasing size of the college-age group. Forecasts of student demand for continuing education programs based on existing data would require extrapolations of levels of demand substantially beyond their observed ranges in available samples.

Demonstration projects that provide incentives to develop continuing education programs hold promise of providing adequate information about both the demand and supply. The projects could include market studies. Ideally, six or more separate departmental experiments would be performed, all in different institutions:

(1) A single humanities department
(2) A group of humanities departments
(3) A social science department
(4) A group of social science departments
(5) A hard science department
(6) A group of hard science departments

Control over the resources for the grouped departments would reside with collegiate deans. Separate projects for departmental and collegiate control would be performed in order to determine the relative efficacy of each. Departmental control would have the advantages of providing direct incentives on all faculty members, including those who do not choose to participate directly. Collegiate control would permit flexibility and more options. All institutions could be in large urban areas with similar degrees of interinstitutional competition to ensure that enrollment response was sufficient and equally possible.

The funding would consist of grants and loans for developing the program combined with an arrangement for gross tuition revenue from the project to be paid directly to the department or collegiate dean. Loans would not exceed departmental supply and expense budgets and amounts available from unfilled budgeted positions. The incentives could be based on alternative assumptions about the success of the program. The payments would come from revenues remaining after repayment of the loans. The repayment schedule could permit substantial payments to faculty members, in addition to salary, for participating in the programs over a long period of time.

The projects could cover a 1-year period for curriculum development and marketing (this would be the period funded by the grant plus loan). Successful projects could continue indefinitely.

7. EFFECTS OF TUITION PRICING POLICIES ON INSTITUTIONAL SURVIVAL

Research Questions/Hypotheses

What would be the legislative funding response to a public university altering the structure of its tuition charges while keeping the average per-student subsidy constant? An example would be a cost-related tuition policy in which tuition charges are proportioned to actual instructional costs.

Problem Situation and Expected Value of Research

One aspect of the effects of tuition pricing policies on institutional survival is the competition between public and private institutions under a dual tuition system. The research project proposed for the Topic 2, "Interaction Between Postsecondary Demand and Supply," deals with this issue.

Another aspect of tuition policy and institutional survival is that major public and private universities charge relatively uniform tuition, but have substantial variations in the costs of their programs. This disproportion between costs and tuition charges makes an institution's overall costs higher by encouraging enrollments in high-cost programs and discouraging enrollments in low-cost programs. The result imposes substantial financial burdens on institutions and subsidizers that are justified only if high-cost programs confer greater societal benefits than low-cost programs. If they do not, uniform tuition charges, which divorce the costs and benefits of training in individual fields of study, contribute to inefficiency in labor markets. In spite of these arguments, few institutions would substantially differentiate their tuition charges according to costs without forecasts of the resulting effects of cost-related tuition on enrollments and costs. In the case of public universities, they must in part base any enrollment-related policy, including alterations in their tuitions, on legislative response and support. Presently, the legislative demand for enrollments is not very well understood.

Relevant Previous and Current Research

Research on the enrollment and cost effects of differential tuition charges based on costs requires cost analysis of institutional programs and enrollment demand analysis in relation to tuition charges. There exist substantial amounts of research on both, referenced respectively in Topics 4 and 5. Hoenack and Weiler (1975) simulated the effects of cost-related tuition on enrollments and costs at the University of Minnesota. This study had two findings bearing directly on needs for future research:

(1) It found, because the ratio of applications to admissions in most high-cost graduate and professional programs at the University of Minnesota is high, that cost-related tuition charges would tend to reduce the quality rather than the level of enrollments.[7] Thus, for institutions with highly selective programs there is need to study the effects of tuition charges on the quality of enrollments.

(2) The study found that reducing tuition charges in relatively low-cost (mostly undergraduate) programs would substantially increase enrollments.[8] Because students in high-cost programs pay higher tuition and since enrollments in these programs would remain nearly the same, the university's revenues and enrollments would both increase. If this university's legislature were willing to fund the additional enrollments, the university would have substantial additional funds (approximately 5 percent of the base budget) for new programs during the 1980's (Hoenack (1977)).

The research question is whether legislatures would fund additional[9] enrollments in public research universities resulting from cost-related tuition. More generally, what is the legislative demand function for the activities of public universities? What penalties can be expected in the future with the enrollment decline, and how could altering tuition charges and enrollments mitigate them? How can we interpret the trends in faculty-student ratios

[7] The study simulated alternative percentage exemptions of graduate and professional enrollments in high-cost programs from increased tuition charges.

[8] This result would occur in most other public research universities and increasingly in private universities, since most of the increased enrollments would be at the expense of enrollments in institutions without high-cost programs.

[9] Considering the likely declines in enrollments in the 1980's, the appropriate question is whether legislatures will fund smaller reductions in enrollments resulting from cost-related tuition.

observed by Freeman (1971), O'Neill (1971), and Radner and Miller (1975) in public institutions?

Research Guidance

The research project would focus on the problems faced by public institutions in controlling their enrollments through tuition charges. Legislative appropriations to public universities would be analyzed as a function of university enrollments placed in several cost categories and other university workload measures. University enrollment and other workload measures would be analyzed as a function both of legislative appropriations and other support. Because both behavioral relationships would contain many of the same variables, the researchers would need to make sure that available data would permit inferences about the separate influences of each relationship. State cross-section data would probably be the most appropriate for estimation; however, the researchers could also investigate the possibility of using pooled cross-section and time series data. The most important estimate would be the separate coefficients for categories of enrollments in public institutions in the behavioral relationships for legislative behavior. These coefficients would likely differ from published legislative funding formulae in States where they exist. The researchers should investigate the possibility that such formulae need to be explicitly incorporated into the model as explanatory variables influencing institutional behavior, legislative behavior, or both.

A valuable test of the estimated model would be to construct an equation from the model which with data on faculty salaries and enrollments could be used to forecast faculty student ratios.

8. ENROLLMENT AND COST ANALYSIS OF CAMPUS CLOSINGS

Research Questions/Hypotheses

(1) How can State higher education coordinating boards, legislatures, and higher education institutions identify excess higher education capacity during enrollment declines in the 1980's?

(2) How can States increase the prospect that institutions closed or consolidated will be those which have the highest costs in relation to quality, or whose absence would impose the lowest burdens on students who would otherwise attend them?

Problem Situation and Expected Value of Research

During the 1960's, many new institutions were established in response to the rapid increases in the number of high school students and the demand for higher education. Many of these institutions established high-quality programs for which there will remain demand during enrollment declines in the 1980's. Others, however, have relatively weak programs and will face substantial enrollment declines. Institutions located in rural areas may face strong enrollment pressures due to migration of college-age students to urban areas and limited opportunities for developing continuing education markets. In public institutions, faculty and administrators who are threatened with the loss of their jobs will seek political support for reductions in all public institutional budgets rather than enrollment-related cuts. This may hurt higher quality institutions with stronger enrollment demands. In addition, there will be attempts to create political pressures for the "redirection" of students from their first choice institutions, reducing the options available to students. No amount of research is going to ease these problems substantially. Strong institutions, however, have an incentive to introduce objective information on en-

rollment demands and institutional costs and quality into State-level policy deliberations relative to enrollment declines.

States with overbuilt public higher education facilities face intensely political decisionmaking about whether to close down some facilities or effect cuts for all facilities. Improved understanding of the nature of this decisionmaking, particularly the vote trading of legislators in districts with higher education institutions, could guide selection of research on institutional costs and quality and enrollment demands likely to influence policy.

Relevant Previous and Current Research

Numerous issues relating to statewide higher education planning are discussed in Halstead (1974). Existing research on institutional costs and enrollment demand has been cited in Topics 4 and 5. Of particular interest is existing research estimating cross-section enrollment demand for attendance at individual institutions. From studies such as Carroll and Relles (1975) and Management Information Division (1975) it is possible to forecast where students attending an institution would attend if the institution were closed down. There have been some useful attempts to estimate economies of scale in nonresearch-oriented public institutions in Great Britain. (Bottomley et al. (1972), Bottomley and Dunworth (1974), and Verry and Davies (1976).) Studies which have analyzed effects of vote trading include Kadane (1972), Miller (1975), and Silberman and Durden (1976). Much of the analysis in Radner and Miller (1975) is relevant to problems of excess capacity within States.

Research Guidance

A fruitful research design would be a thorough analysis of excess higher education capacity in a single State, including evaluation of several alternative policy options for dealing with excess capacity, which are likely to be proposed in many States. The researchers would attempt to discover and communicate the degree to which research could inform State-level decisionmaking and explain when research would not be useful.

It is difficult to define just what "excess capacity" is; the researchers would probably need to provide alternative concepts of optimal provision of higher education within a State.

(1) One part of the study could be a cross-section analysis of costs, especially in public nonresearch institutions, with tests for economies of scale in administration and instruction (the presence of significant research activity in an institution makes it difficult to identify costs or economies of scale in instruction).

(2) A second part of the study could estimate enrollment demand functions for each of several institutions in the State and provide forecasts of the enrollments in all other institutions if any one were closed down.

(3) Another part would analyze the politics of State higher education policy, including the benefits provided to a local community by a campus, and attempt to identify the vote trading responsible for support for campuses with low enrollments relative to capacity. This part of the study would examine whether other campuses could find support for closing down a given campus, based on their resulting increased enrollments and funding which would "outbid" the supporters of the campus under consideration for closure.

9. INDICATORS OF FINANCIAL STRESS IN POSTSECONDARY EDUCATION INSTITUTIONS

Research Questions/Hypotheses

(1) What concepts and measures would improve understanding of the causes of financial stress in postsecondary education institutions?

(2) What types of analyses and modeling would improve understanding of the control that institutions have over the variables which influence financial stress?

Problem Situation and Expected Value of Research

The widespread concern about how colleges and universities can adapt to an environment of little or no growth after the post-World War II period of rapid growth has led to efforts to define institutional financial "stress" and to develop "indicators" of the degree of stress. Unfortunately, there has been little research on the causality underlying financial stress to enable institutions to know what they can do about it. In particular, little is known about how behavior which an institution can influence (e.g. faculty behavior through incentives, enrollment behavior through tuition policies) interrelates with behavior which an institution cannot influence (e.g. demography, inflation, Federal and State higher education subsidy policies) to produce financial stress and other undesired results. An improved understanding of these interrelationships can assist institutions in avoiding undesired situations and help them understand when they lack control over them. Improved understanding of the causality underlying institutional financial stress could lead to more useful institutional modeling.

Relevant Previous and Current Research

(1) *Definitions and Indicators of Financial Stress.* Well-known discussions of financial difficulties of colleges and universities have been provided by Balderston (1972, 1974), Cheit (1971), Jellma (1973), and the National Commission on the Financing of Higher Education (1973). Measures of the financial health of institutions have been provided by Jenny (1974, 1977), Lupton, Augenblick and Heyison (1976), Minter 1977), and Van Alstyne and Coldren (1976), among others.

(2) *Planning Models.* An institutional planning model which can be used to plan "alternative future configurations" for a university satisfying assumed long-run financial constraints is in Wehrung, Hopkins and Massey (1976). A number of faculty flow models have been developed by Hopkins (1974ab, 1975) and other researchers that can facilitate planning in relation to promotion and retirement decisions. A model combining enrollment forecasting with faculty flow modeling, enabling evaluation of the effects on faculty size and composition of tuition and continuing education policies, is provided in Hoenack and Weiler (1977). Useful approaches to modeling behavior within institutions are provided in Fox (1972) and Geoffrion, Dyer, and Feinberg (1972).

(3) *Institutional Financial Stress as a Product of Forces Other Than the Absence of External Funding.* A number of studies suggest that behavior within higher education can lead to financial stress, even at high levels of funding. Clurman (1969) suggests that competition between public and private institutions under a dual tuition system creates financial stress through the need for private institutions to compete on the basis of "quality". Another possible source of institutional financial stress is the political nature of internal budgeting. Pfeffer and Salancik (1974)[10] found that measures of departmental political power, particularly committee memberships

along with measures of teaching workloads and academic quality, can influence the determination of one university's budgets. The study suggests that institutional decisionmaking may be partly divorced from fiscal responsibility, leading many colleges and universities to be more or less always in financial stress. However, an environment of limited or no growth is particularly stressful because of lack of incentive to drop activities becoming less important in order to release resources for activities becoming more important. Dunworth and Cook (1976), Hoenack and Norman (1974), Hoenack (1977) and the University of Pennsylvania (1973)[11] hypothesize that closer alignment of responsibility for resources with decisionmaking authority would reduce various types of institutional financial stress.

Research Guidance

In consultation with administrators of several types of institutions, the researchers should define several major categories of financial relationships (e.g. undesired long run cash flow situations such as reductions of future endowment income) to tradeoffs between financial and other variables (e.g. between tuition and characteristics of students; salaries and characteristics of faculty; and capital expenditures and the deterioration of capital facilities). For each category, the behavior underlying the causality of financial stress should be modeled. It would be desirable for the modeling to be sensitive to three issues:

(1) The behavior which can and cannot be influenced by policy action within the institution should be carefully distinguished, and hypotheses about behavioral effects of incentives presented.

(2) It should be made clear where, within the institution, control over behavior is held. For example, tuition policy influencing enrollments may reflect administrative authority, while tenure decisions may reflect departmental authority.

(3) The feasibility of forecasting behavior which cannot be controlled should be evaluated.

Based on the analysis of the causality underlying each category of financial stress, the researchers could provide an assessment of the most fruitful ways for an institution to deal with each (including doing nothing when an instituton lacks control over related behavior or events). Can the relevant causality be modeled, and if so, can the relationships be measured? Can the degree of institutional control be measured? How can existing modeling approaches (e.g. existing methods of faculty flow modeling, or enrollment demand analysis) be employed along with new behavioral models in the modeling of the causality underlying financial stress? It would be valuable for the researchers to design pilot tests to be carried out in several types of institutions.

[10] Hills (1976) has made a number of improvements on the statistical methodology of the Pfeffer and Salancik study, has disputed some of its conclusions, and suggested further research.

[11] Strauss (1975) discusses the implementation of a budgetary system that matches resource responsibility with decisionmaking authority at the University of Pennsylvania.

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PRODUCTIVITY ISSUES

1. THEORIES AND MEASURES OF LEARNING

Research Questions/Hypotheses

(1) Are there predictable patterns in adult learning?

(2) What are the impacts of external factors on adult learning?

(3) What taxonomy of learning most comprehensively describes adult learning accomplishments?

(4) What are the relationships between socioeconomic characteristics and individual learning or developmental characteristics?

Problem Situation and Expected Value of Research

The basic purpose of postsecondary education is human and organizational learning. Declining test scores, charges of irrelevant curricula, and graduates who are barely literate or numerate—all attained at increasing cost—raise questions about the substantive learning in our institutions. The increasing emphasis on older adult learners as institutions respond to the decline in young students raises further questions about patterns of adult learning.

Answers to the research questions could inform faculties in designing their teaching, deans in evaluating learning environments, and chief executives, boards, and State agencies in assessing the amount of learning occurring in our colleges and universities. An outcome-oriented understanding of learning could also incorporate learning experiences from outside of colleges and universities and enable public policymakers to take a broader view of learning versus teaching.

Relevant Previous and Current Research

Drawing upon developmental psychology, psychomertics, and educational psychology, Bloom (1956), Maslow (1970) and others have developed taxonomies of learning. Piaget (1972), Levinson (1974), Loevinger (1976), Perry (1970), Kohlberg (1972) and others have developed theories of structural development that can be used to describe adult learning. Kolb and Fry (1974) have developed a taxonomy of the styles of cognition. All of these studies provide some guidance to the type of data to be collected, the collection instruments that could be used, and the type of analysis to be pursued.

This project is a fundamental element of productivity research. The ability to describe and measure the quantitative and qualitative dimensions of learning is essential for analyzing the cost effectiveness of postsecondary education (Topic 3), the impact of postsecondary education on socially desirable personal characteristics (Topic 5), and the development of alternative measures of productivity (Topic 8).

Research Guidance

Postsecondary education enables adults to learn more about more topics than they knew previously; to change their position in a sequence of structural development and acquire a different world view (see Chickering (1976)); or to develop new styles of learning which enable them to take advantage of diverse opportunities. This research should be designed to separate the various institutional and ex-

ternal effects. These outcomes could result from influences outside of colleges: growing older, coping with new situations, mentor roles, and increased personal responsibility from military and work activities. Research should separate the effects of simultaneous and interactive influences.

One approach would be a longitudinal study to continue for at least 10 years (Levinson and Loevinger's works both extended over 20 years) with preliminary results available after 5 years. The sample could be representative not only of various ages and other demographic characteristics, but also of individuals at various points along the developmental continua. A variety of test instruments ranging from questionnaires to open-ended interviews could be examined and tested. To include 10 age groups, 5 developmental stages, 4 dominant learning styles, 5 ethnic groups, 5 income/socio-economic groups, 5 occupational groups, 4 regions, and 2 sexes with an average cell size of 100 would require a sample of 20 million, which is unreasonably large. A more compact design is essential.

Another approach could be to study in depth the individuals attending a carefully selected set of institutions. This would have the advantage of intensity and comprehensiveness, but the disadvantage of limited generalization.

The references should be reviewed for a full discussion of data sources, alternative conceptual models, traditional assumptions, and the limitations of previous research.

2. INFORMATION FOR STUDENT CHOICES

Research Questions/Hypotheses

(1) What factors are important in individuals' choices to participate in formal learning opportunities?

(2) What are the sources of information used by individuals in their decisions?

(3) What teaching methods are likely to generate valid and timely information?

(4) How congruent are student and institutional perceptions and objectives?

Problem Situation and Expected Value of Research

In the United States we depend upon student choice to allocate postsecondary educational services. Most (61 percent) students apply to only one institution. Most (85 percent) students who apply to three or more schools are admitted by one of their choices (Jackson 1977). Higher education is a buyer's market which presumes that consumers are well informed. Currently, the Fund for Improvement of Postsecondary Education (FIPSE) is sponsoring institutions to develop student-oriented information better in degree, though similar in kind, than similar institutionally-provided information. This research could:

(1) Enable institutions to influence individual choices more effectively.

(2) Allow State or Federal agencies to provide individuals with information relevant to their choices.

(3) Permit independent, consumer-based organizations to collect, prepare, and disseminate information for individuals considering formal learning opportunities.

(4) Provide multiple sources of valid information as the best consumer protection strategy.

Relevant Previous and Current Research

Numerous studies of college going choices have been published (see Jackson (1977) for a survey and recent comprehensive analysis of college going

choices), but these studies have not focused on the information available to individuals at the time of their choice or on the sources of information available. What is needed is a factual description of what potential students know about:

(1) Their own educational and career plans and aspirations

(2) Societal and labor market conditions

(3) The salient characteristics of a school's programs and the variety and nature of the learning experience it offers

(4) The congruity of their learning style and the school's program characteristics

(5) The likelihood of meeting their educational aspirations at different schools

(6) The pre- and post-employment and personal growth experiences of similar individuals who attended the programs within school they are considering

(7) The actual prices charged and grant assistance available

This study is linked to Topic 1 and should follow at least the design phase of Topic 1.

Research Guidance

One alternative would be to draw upon quantitative sociology and economics to develop a longitudinal study of individuals at typical college sites that could illuminate these research questions. It would be important to study a sample of individuals, not just college attenders, and to observe their actual life/education/work options and choices.

Such a study could include the sources of information accepted as well as those rejected in order to provide some basis for studying the effectiveness of alternative sources of information. (The College Entrance Examination Board (CEEB) is experimenting with alternative patterns of providing college information to high school students and may be of some help in this study.)

Another alternative could be to focus on student and institutional perceptions and study their congruity. More out of a market research paradigm, this study would not necessarily seek evidence of behavioral causality, but would deal with perceptions, images, and market responsiveness.

See Jackson (1977) for a full discussion of currently available data sources, alternative conceptual models, and assumptions and their limitations.

3. INCREASED PRODUCTIVITY THROUGH STRUCTURAL CHANGE

Research Questions/Hypotheses

(1) What is the cost effectiveness of alternative arrangements of curricula?

(2) What structural arrangements of academic decisionmaking will address the effectiveness of both resource use and student learning?

(3) Is there any relationship between student and faculty learning/teaching styles and student outcomes?

(4) Do different curricular arrangements affect learning and use resources in different ways?

(5) Assuming that multiple outcomes result from postsecondary education, how are these outcomes linked in production or effectiveness?

(6) What institutional arrangements increase multiple outcomes?

Problem Situation and Expected Value of Research

Understanding the relationships between the structure of the curriculum, the styles of teaching and learning, and the pattern of resource use, in relation to learning effectiveness or productivity, could:

(1) Enable academic administrators to allocate resources in more cost-effective ways.

(2) Enable State and Federal decisionmakers to use institutional support policies to create incentives for efficiency in resource use.

Relevant Previous and Current Research

The efficiency of curricular arrangements have been subjected to relatively little research. Bowen and Douglass (1971) analyze the cost consequences of several liberal arts curricula. Kolb and Fry (1974) developed a learning style inventory to study the congruity of techniques and learning styles. Weathersby and Henault (1976) calculate the cost effectiveness of experiential learning from both the student and institutional perspectives. Carlson (1977) reviews most of the recent resource use studies in higher education.

Carlson's work shows that efficient surfaces can be identified, although efficiency cannot be uniquely attributed to curriculum. Trueheart and Weathersby (1977) showed that continuous production functions can be used to describe resource use behavior along the efficient surface.

The relationships between structures of decisionmaking and effectiveness of resource use are just beginning to be analyzed. In addition to Cohen and March (1974), there has been relevant work by Helsabeck (1973), Buchanan and Devetoglou (1970), Hoenack (1974), and St. John and Weathersby (1977). A careful case study approach along the lines suggested by Helsabeck or St. John and Weathersby could generate enough evidence to study the relationships between academic decisionmaking and the explicit consideration of curricular cost effectiveness. Alternative structural arrangements could be identified and their apparent congruity of resource and educational decisions described. This is the kind of question that has no definitive answer, but more carefully articulated alternatives are certainly possible.

The development of this topic should await progress in the identification of educational outcomes (Topic 6) and the theoretical developments of learning patterns (Topic 1).

Research Guidance

Given a set of institutional outcome measures (the results of Topic 6) one alternative would be to examine a set of institutions which are processing similar objectives and offering qualitatively similar student outcomes; to calculate their resource inputs standardized for regional price variations; and to estimate the efficient surface-relating multiple inputs and multiple outcomes. One could then test whether curricular or other arrangements made any difference:

(1) Are statistically different efficient surfaces identified when one controls for the structure of the curriculum?

(2) Is the mean resource use of one curriculum significantly different from other curricula?

(3) Do alternative taxonomies of curricula change these results?

An alternative approach would be to identify exemplary institutions or organizations that have adopted markedly different curricula structures (competency based, open labs, contract learning, predominantly computer-aided, etc.) and develop detailed case studies of their effectiveness, productivity, and resource use.

The learning style inventory has been tested for several years, but could profit from reexamination in light of this broader applicability. Two relationships

need to be tested statistically: the degree of congruity of learning styles and student outcomes (i.e. what is the impact on effectiveness?); and the degree of congruity of learning styles and costs (i.e. what is the cost effectiveness?).

4. EFFECTIVE USE OF INFORMATION IN PUBLIC EDUCATIONAL POLICY

Research Questions/Hypotheses

(1) What kinds of information do public policymakers use in making decisions about support for postsecondary education?

(2) What sources of information about educational productivity are considered valid and reliable by public policymakers?

Problem Situation and Expected Value of Research

Although hundreds of millions of dollars are spent annually to increase the supply of research findings, very little is spent to analyze the alleged demand for research findings. Robert Andringa (1976) recently cataloged his impressions of the sources of information members of Congress use in their decisions; academic research or evaluation reports rated last. Redman (1974), Allison (1973) and Steinbrunner (1974) all show that rational analysis is a poor proxy for real decisionmaking. It is difficult to determine whether policymakers inherently oppose data and analysis, or whether most analysis is irrelevant to policymakers.

Better answers to the research questions could enable advocates of postsecondary education to be more effective in making their case for public support. The failure to answer these questions means that all of the rest of the productivity research will have little policy impact.

Relevant Previous and Current Research

The use of information by policymakers is just beginning to be studied systematically (Metzler, 1976; Government Accounting Office, 1977). There is not a well-organized disciplinary base for this research. Relatively little productivity information has been available in the past and it is difficult to assess its impact.

This study should not be envisioned as an evaluation study using outcomes measures and other tools developed in related projects.

Research Guidance

Recognizing the limited experience scholars have had in this area of research, suggestions at this time are tentative.

The most fruitful point of departure may be the study of legislative and executive decisionmakers in action. Several key decision areas (such as budgets, program authority, and executive reorganization) could be identified and decisions followed carefully for 2 or 3 years in a detailed case study. States with active legislative analysis or legislative committee staffs could be compared with States which rely largely on executive staffs. "Interaction analysis" information flows could be charted. Research findings could be introduced experimentally and in various formats. Decisionmakers could be polled and asked how they would vote, given their current information; this could be compared with their actual votes and budget magnitudes. With the sensitivity developed in these case studies, a set of hypothetical circumstances could be designed to have decisionmakers assess the value of information about the economics or productivity of higher education.

Formats, sources, media, and personal experiences of information transfer could be systematically

varied. The value of information is that it changes decisions. Without understanding how decisions are made we cannot know what changes decisions. By observing actual decisions and experimenting with the format and content of information we can begin to understand how decisions are made and the role of information.

5. ROLE OF POSTSECONDARY EDUCATION IN MEETING SOCIETAL NEEDS

Research Questions/Hypotheses

(1) What are the societal needs for postsecondary education?

(2) How are societal needs related to individual behavior?

(3) What is the effect of postsecondary education on individual behavior and community vitality?

(4) What individual characteristics are most important to society?

Problem Situation and Expected Value of Research

Many individuals concerned about public policy in postsecondary education believe that a greater good is served by postsecondary education. Although there has been a remarkable consensus on the verbal descriptions of the objectives for postsecondary education (Trivett, 1973), these objectives are usually defined in terms of characteristics of postsecondary education such as equality of access, quality, efficiency, or diversity; and not in terms of meeting broader societal needs.

Better answers to these research questions could provide a more carefully articulated behavioral rationale for encouraging postsecondary education based on its significant contributions. These questions also shift the focus of educational outcomes from employment and salaries to behavior and lifetime contributions.

Relevant Previous and Current Research

Earlier research has focused on the societal benefits of education (Weisbrod, 1964), the assumed impact of higher education on economic growth (Denison, 1964), the development through higher education of socially desirable personal characteristics (Chickering, 1969), and a relatively few other topics such as social or geographic mobility or regressing income inequality (Jencks, et al., 1972). However, there has been very limited work in the broader areas both of societal needs and the limited contribution possible by higher education.

This study could be done independent of other projects, or be linked to Topic 1 (patterns of learning) and Topic 6 (identification of outcomes), depending upon the emphasis chosen.

Research Guidance

A first step towards a broader perspective could be to develop several taxonomies of societal needs. Five or ten very creative and imaginative individuals could each be asked to develop independently their essays on societal needs and how their attainment could be measured. There is no analytical answer to the search for the best description of societal needs but, following a conference of key policymakers discussing the 5-10 essays, one might distill a summary description.

Given an operational description of societal needs, the other research questions become more tractable. For example, if one societal need is for a spirit of renewal in our social institutions, the individual characteristics most contributory to renewal might be creativity, autonomy, and a commitment to excellence; postsecondary education's role in influencing these characteristics is in accelerating the rate of

structural development (Topic 1). By observing a wide variety of communities exhibiting varying degrees of attainment of societal needs and objectives (employment, health care, aesthetics, leisure, etc.), one could analyze the statistical correlations with different individual characteristics. This analysis could be cross-sectional as well as longitudinal.

Analogous to Topic 1, estimating the impact of postsecondary education on individual characteristics (see Chickering, 1969) requires a longitudinal study of reasonable magnitude. In addition to knowing that a person attended or completed college, one should attempt to analyze the different effects of partial completion in a variety of institutional settings, or a variety of programs within a single institution.

6. STUDENT AND INSTITUTIONAL OUTCOME MEASURES

Research Questions/Hypotheses

(1) What measures of student outcomes are relevant to management?

(2) What measures of institutional outcomes are relevant to management?

(3) How are student and institutional outcomes related?

Problem Situation and Expected Value of Research

While there are many and specific concerns about the rapidly escalating costs of higher education, the concerns about the outcomes of higher education are ambiguous until substantial unemployment or underemployment of college graduates is observed. More effective management of higher education requires more attention to the consequences. Topic 3 deals with the resource productivity within institutions, relating resources consumed to outputs produced. However, that research requires an appropriate identification of institutional and student outcomes. The important policy implications of this topic are:

(1) A new vocabulary to describe the outcomes of postsecondary education.

(2) Clarity in describing the contribution of institutions not just what students bring to them.

(3) The possibility of shifting the rationale of postsecondary education from virtue to effectiveness.

Relevant Previous and Current Research

The identification of the outcomes of postsecondary education has been under serious investigation for more than a decade (see Lawrence, et al., 1970, Astin, 1977 and Micek, 1973). There are counterpressures towards comprehensiveness checked only by the unwieldiness of lists, and towards summary measures checked only by dissatisfaction with their simplistic, superficial nature. More work in development of outcome measures and more experience with using them are essential before any final judgments can be made. This topic is of vital importance to Topics 3 and 5.

Research Guidance

One key to progress in this area is to identify the major managerial decisions of institutions and State and Federal agencies that could be informed by outcome measures. With respect to these decisions (budgeting, program review, personnel, etc.) three or four strongly differing descriptions of outcomes could be developed and tested. Measures which policymakers found helpful, or researchers identified as effective in changing decisions, should be retained and others discarded. By a successive process of proposing strongly drawn paradigms and discarding ineffective measures, one could develop a list of outcome measures found useful in a wide variety of

situations. This is the opposite of the recent practice of making outcome lists increasingly comprehensive in response to complaints and proposals.

Once a suitable working list is developed, cross-sectional and longitudinal data on student and institutional outcomes could be collected and their interrelationships estimated. This could draw in part on the theory and results of Topic 1.

7. INTERNAL PRICING AND INCENTIVE EXPERIMENTS

Research Questions/Hypotheses

(1) Are outcome-related internal prices effective in changing decisions about postsecondary resource use or academic programs?

(2) Are internal pricing systems more efficient than budgeting or other resource allocation methods?

(3) How should internal prices be established to match educational outcomes more closely with institutional or governmental objectives, or institutional efficiency?

(4) What factors influence faculty decisions on how to spend their time, energy, and abilities in colleges and universities?

(5) Which factors are externally controllable and significantly effect faculty decisions?

(6) How should externally controllable factors be used to influence faculty decisions toward institutional objectives?

Problem Situation and Expected Value of Research

The internal allocation of resources can be used to stimulate faculty and other employees to engage in outcome-producing activities consistent with institutional objectives. One way of doing this is to link resource acquisition by department or other program units to their outcomes produced, through an internal pricing system rather than through a budgeting procedure. If successful, internal pricing systems would allow administrations to create incentives instead of imposing constraints; this may be a more efficient means of resource allocation.

Assuming that evaluation, review, promotion, tenure, salary, recognition, and other administrative decisions affect faculty decisions, administrators who understand how to use these decisions as incentives to alter faculty use of their energies and abilities could be more effective administrators. Because faculty salaries are a major part of institutional expenditures, increased congruity of faculty actions and institutional objectives would increase the productivity and efficiency of institutions.

Relevant Previous and Current Research

Internal pricing systems for colleges and universities have been contemplated for some time, Breneman (1971), but have rarely been tried. Formula budgets are a step towards internal pricing except they generally reward activities (e.g., student contact hours, or number of students enrolled), rather than outcomes. Because there are no fully-accepted outcome measures, the development of which is the objective of Topic 6, there are currently no outcome-related internal pricing systems to study. Relatively little research has been done on how faculty members make decisions on the use of their own time and energies. Caplow and McGee (1965), Brown (1967), and Kirsching and Staaf (1975) have all proposed economic models of faculty behavior. Ladd and Lipset (1975) have surveyed faculty attitudes extensively. But all of these previous works have been too broad; what is needed is a micro-analysis of the factors in faculty decision.

This project would draw on the results of Topic 6 (identification and measurement of outcomes) and should follow substantial developments in that area.

Research Guidance

One alternative could be a pilot program of outcome-related internal prices, developed in a carefully-controlled experiment. In conjunction with the efficient surface analysis described in Topic 3, research questions (1) and (2) could be addressed.

After investigating the effectiveness/efficiency questions of internal pricing systems, the next question is: How should prices be established? This requires estimating the partial responsiveness of individual and organizational decisions to changes in price alone. In this area, cross-sectional data would probably not be as informative as time series data on institutions with varying internal prices. Assuming prices were deliberately changed every semester, at least 5 years of data would be needed to begin to estimate these price responsiveness coefficients.

Question (6) has two parts:

(1) What are the partial effects of changes in externally controllable factors on faculty decisions?

(2) What are the partial effects of changes in faculty decisions on student and institutional outcomes?

The first part can best be analyzed by examining data reflecting accidental, random, or deliberate variations in externally controllable factors, and the resulting faculty decisions. If personnel and professional practices have been standardized as completely as many claim, conscious experimentation may be necessary. Perhaps in conjunction with the institutions experimenting with outcome-oriented internal pricing, other faculty incentives could also be varied.

8. ALTERNATIVE MEASURES OF PRODUCTIVITY

Research Questions/Hypotheses

(1) Are there alternative and more comprehensive measures of productivity?

(2) How can decisionmakers be persuaded to use alternative and improved measures instead of traditional measures?

(3) What combination of informational and organizational change would increase the effectiveness of administrative decisions?

Problem Situation and Expected Value of Research

To the extent that measures inform and alter decisions, alternative and more comprehensive measures could lead to more effective decisions.

Relevant Previous and Current Research

All measures of productivity involve the relationship between resources used and outcomes produced. The development of alternative measures of productivity could have two dimensions to devise new relationships among existing resource use and outcome measures, (e.g., marginal cost per student instead of average cost per student), or to devise new measures for resource use or outcomes. Topic 6 is to devise new outcome measures particularly appropriate for management. Therefore, the major contribution of Topic 8 would be to devise new relationships among the measures developed in Topic 6 and test their acceptability among policymakers.

Research Guidance

Following Topics 3 (1), 4 and 6 (1), one could develop alternative productivity relationships among the new outcome measures and resource makers. Actual decisions of policymakers should be monitored to determine if any decisions are changed by the new information. Computing new relationships cost very little once the new measures are in hand; consequently, any improvement in decisionmaking effectiveness would probably justify the cost of the new productivity relationships.

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MANAGEMENT ISSUES

1. EXAMINATION OF THE DECISIONMAKING HIERARCHY IN POSTSECONDARY EDUCATION

Research Questions/Hypotheses

(1) What are the dominant values, goals, and priorities at the Federal, State, and institutional level of postsecondary education?

(2) How, and to what extent, do the goals and priorities at these levels correspond?

(3) What are the congruent areas of authority, responsibility, cross-level organizational structure, and decision wherein the various levels best mesh?

Problem Situation and Expected Value of Research

A number of pressing issues are of common concern to educational policymakers at the Federal, State, and institutional levels. Policymakers at all three levels are interested in many of the same issues, and often take independent approaches and solutions. A public institution may adopt the free market approach to the declining enrollment problem while the State coordinating agency may be seeking a manpower planning approach to enrollment.

Research which can lay out complementary models of Federal, State, and institutional authority, decisionmaking responsibilities, and structures can improve the effectiveness of postsecondary education management. Alternative models of the distribution of decision authority are needed for a more rational organizational structure. Alternative structures which promise to separate on some defensible basis the domains of Federal, State, and institutional managers should help to reduce conflict and increase cooperation and efficiency.

This research should prompt further development and application of modeling. Under the best circumstances it would find some application in the bylaws of State coordinating agencies and individual institutions as well as in future Federal funding of postsecondary education programs.

Relevant Previous and Current Research

State and national goal statements, including results of four recent "name" committees, have been reviewed (Trivett, 1973). A current study questions the impact of commissions, particularly in relation to goals (Longanecker and Klein, 1977). Popular opinions and attitudes have been examined in relation to research findings (Shulman, 1976). A conceptual framework for viewing decision levels and functions was developed by the American Association of State Colleges and Universities (Institutional Rights and Responsibilities, 1971). This schema has been extended (The States and Higher Education: Supplement E, 1976), drawing on other sources. Philosophical, jurisdictional, and technical issues have been outlined (Chaney et al, 1976). While a broad range of planning, and management functions are addressed in these pieces, they emphasize the institutional-State interfaces, not the Federal-State and Federal-institutional relationships. The role and influence of national agencies and associations and of the public have not been figured in, nor has the question of differential authority between legislative and executive branches at the same level been addressed. Structural control and policymaking have been addressed by Clark and Youn (1976). A

public administrative perspective is outlined by Morrow (1975). Alternatives to national-bureaucratic models of organizations and decisionmaking have been proposed; e.g. Easton's (1965) framework for political analysis, a "garbage can" theory (Cohen et al, 1972), and others (Lorsch and Lawrence, 1972).

There is extensive social science research on interorganizational and environmental relationships (Thompson and McEwen 1958, Klongman et al 1976, Evan 1976). Conceptions of interorganizational patterns in higher education have been set forth (Clark, 1965), but there is little research (Ensign 1972).

Concepts of power, authority, and control have been explicated (Zald 1970, Tannenbaum 1968, March 1965). Research has looked at differences in distribution and centralization/decentralization within an institution, but less has been done across "system" levels, (Gross and Grambsch, 1968, 1974; Baldridge 1971a, 1971b; Baldridge et al, forthcoming 1977, Kruytbosch and Messinger 1970). Another important area is research on conflict and conflict management (Thompson 1967, Scott 1965, Lerner 1976). Assumptions about conflict and conflict management in different organizational views are summarized by Lorsch and Lawrence (1972).

Research Guidance

Any attempt to derive the dominant goal priorities at each level of postsecondary education would be ambitious; nevertheless, some work has been done on institutional goals as perceived by administrators and faculty. This work needs to be expanded to postsecondary goal priorities of State and Federal level personnel, as goal priorities pertain to their organizations.

Bibliographic research would be helpful to summarize available work on postsecondary education authority structures and their interfaces, such as divisions of authority and responsibility between State coordinating boards and institutions.

Most significant but most demanding in terms of both data and theory would be the conceptualization of Federal, State, and institutional relationships in a comprehensive way, given some knowledge of the value sets and objectives at each level. Alternative sets of authority and decision structures to be examined should include laissez-faire and planned systems as well as centralized and decentralized systems. Different functions probably require different distributions of authority and decisionmaking responsibility among Federal, State and institutional managers. For example, authority over student access and student financial support tends to be more highly centralized at present than does authority over curricular offerings. Feasibility might dictate division of authority into a number of submodels treating separate functions and programs.

Important baseline work would be an empirical analysis of the formal authority of the Federal Government, State governments, and institutions in each of the areas where the Federal Government has a significant role in goal setting and policy formulation. Areas such as student assistance (under Higher Education Act IV), sponsored research, affirmative action, developing institutions (under Higher Education Act III), program funding in health sciences (including capitation grants), sponsored research, and State postsecondary education commissions should be explored. Projects might include a compendium of Federal rules which impact upon States and individual institutions, as well as a compendium of State regulations impacting upon institutions. The object would be to describe the distribution of authority as well as conflicts, overlaps, and gaps which constrain and support institutional management.

Another possibility is a sample survey of institutional administrators to gain their perceptions of the actual influence of Federal and State regulations on

institution-level decisions. The purpose would be to gain an institution-level perception of the influences of Federal and State authority on the management of institutional programs and functions.

2. BETTER MEANS OF COORDINATING SHORT-RANGE BUDGETING WITH LONG-RANGE PLANNING

Research Questions/Hypotheses

(1) How can stronger links be developed between multiyear planning activities and annual budget processes?

(2) What gaps between planning and budgeting exist in current operational schemes?

(3) How can the present planning and budgeting models be expanded to fill these gaps?

Problem Situation and Expected Value of Research

Most of the literature on planning and budgeting assumes a straightforward, narrowly rational process of decisionmaking: careful preparation for future decisions in the form of planning; a rational choice among alternatives; and implementation of the decisions in the form of budget allocations which are consistent with the alternatives chosen. In the cross currents of actual campus life, however, the links between planning and budgeting are seldom that rational and methodical. Academic program planning is typically carried out by faculties (or with significant faculty input) with little direct analysis of the implied resource requirements. Budgets are constructed by administrators, often with inadequate reference to and analysis of academic program plans. As a result, year-to-year budget allocations are frequently incremental, ad hoc, and disjointed.

The shortcomings of the "straight-arrow" models of planning and budgeting have been pointed out by Baldridge, Cohen, Lindblom, Weathersby and others. They recite the forces at play in college and university administration: the politics of self interest and mistrust; the desire to leave objectives ambiguous and flexible; the concern for power; the appeal of academic freedom; and the disdain for cost accounting. Prescriptive literature has paid little attention to these behavioral influences on institutional management.

A major obstacle to institutionalizing formal planning and budgeting systems is the influence of value assumptions and behavioral influences upon program and resource allocation decisions. Conceptual analysis is needed to develop models of the planning and budgeting process which take into account these aspects of decisionmaking. Such analysis would bring together more comprehensive theoretical models of the decision process and narrower constructs of the planning and budgeting process. In so doing, it would make the applied literature on the subject more valid and applicable.

Relevant Previous and Current Research

The history of budget development and reform has been traced (Schick 1966). Dill et al (forthcoming 1979) extend the discussion in a higher education context. The rationale of Planning, Programming, and Budgeting Systems (PPBS) and Zero Base Budgeting (ZBB) are provided by Lyden and Miller (1968) and Pyhrr (1973) among others. Theories of budgeting and resource allocation have been outlined by Davis et al (1966) and Pondy (1970). A contingency approach to budgeting and a program of budgetary research are proposed by Dill and Tonn (1977) Wildavky (1974) has studied the politics of the budgetary process at the Federal

level; the implementation and demise of Federal Planning Programming, and Budgeting (PPB) are assessed by Schultz (1968) and Schick (1973). At the State level, Bowen et al (1976) describe State budgeting processes for higher education, and interagency conflict is examined (Glenny, 1976). Innovations and change in State budgeting are explored (Schick 1971, Howard 1973, Ziegler and Johnson 1972). Lingenfelter (1975) studied the transition to PPB in three States and found no substantial department from incremental allocation. Casselman outlined efforts to introduce PPB and bring about State executive reorganization at the same time (1971, 1973). Brown and Pethel (1974) and Peterson (1978) have studied State level performance budgeting. Current implementation of ZBB is assessed (Schick 1977, Lynch 1977). Formula budgeting is covered in Topic 7. Viewing budgeting as a political process, the use of power has been examined (Pfeffer and Salancik, 1974; Salancik and Pfeffer, 1974; and Pfeffer, 1977). Intergroup conflict (Pondy 1964) and conflicting roles (Barret and Fraser, 1977) have been studied. Determinants of resource allocation (Hills, 1976), and structure and control (Moch 1976; Bruns and Waterhouse 1975, and Hofstead 1973) have been the foci of other research.

The planning component is discussed in Topic 6.

Research Guidance

Cryptic review and synthesis in three topical areas would be useful as a baseline for further research:

(1) The most popular how-to-do-it planning and budgeting approaches.

(2) Experience with these approaches on the part of colleges and universities which have made serious efforts to implement them.

(3) Organization and decision-process literature which incorporates the behavioral aspects as they apply to planning and budgeting decisions.

Of significant benefit would be construction of alternative prescriptions for the planning and budgeting process: more comprehensive prescriptions which go beyond the narrow logic of the situation to the behavioral aspects of an organization which must be accommodated.

Empirical studies of the presence or absence of links between multiyear program planning decisions and annual budget decisions at the Federal and State level would also be illuminating. Students of postsecondary education planning and budgeting seem to agree that multiyear program planning and annual budgeting are typically carried out independent of each other, not only within institutions but also in Federal and State agencies. The most publicized attempts to introduce program budgeting at these levels are regarded as failures, not because the concept is illogical, but because the view of the process is too restricted and the amount of supporting analysis and management sophistication required by the approach is overwhelming. A realistic, incremental approach to linking long-range program planning and annual budget decisions may be needed. An empirical study which identifies the present state of the art in governmental agencies concerned with postsecondary education would help. Most future progress on the amalgamation of planning and budgeting functions will probably be made by operating managers; the study would include their assessments of the obstacles to more effective linking of these management functions.

3. EFFECTS OF FEDERAL FINANCING PROGRAMS AND POLICIES ON STATE DECISIONS REGARDING POSTSECONDARY EDUCATION

Research Questions/Hypotheses

(1) To what extent do Federal programs and policies on postsecondary education impact upon State decisions and policies, particularly in funding decisions?

(2) What is the degree of interdependence of Federal-State educational decisionmaking?

(3) How does the degree of interdependence vary by Federal program area?

Problem Situation and Expected Value of Research

When both Federal and State monies are intermingled in funding postsecondary education programs, such as student financial aid, it is difficult to determine the extent to which either the Federal or State agency is achieving its funding objectives. The charge is often made that Federal programs, particularly those requiring matching funds, alter decisions at the State level, and indeed that is part of the Federal intent. On the other hand, the charge is often made that Federal monies merely substitute for funds which would have been spent by the State in any event, and that priorities and decisions by the State are often maintained in spite of Federal funding. Where educational program objectives of both the State and Federal governments are congruent, Federal financing presumably poses no basic problem. Where program objectives of these two governmental bodies are not congruent, dissidence or conflict in controlling decisions presents problems.

Continuing, systematically-produced evidence on decision interdependence, particularly funding interdependence by program area, would be a useful management tool for Federal and State policymakers.

Relevant Previous and Current Research

Gross (1965) summarizes earlier findings of empirical research on national planning, providing analytical-descriptive (but not prescriptive) generalizations, e.g., planning for resource *acquisition* takes precedence over planning for resource *utilization*. Recent and historical trends in Federal support have been traced (Carnegie Commission 1972). The National Commission on the Financing of Postsecondary Education (1973) studied financing patterns and assessed alternative models. More recent trends and impacts of revenue sharing have been examined (Nathan 1975).

There is little empirical research on higher education and its environment, or on interorganizational relationships and impacts (Peterson 1973). The relationship between public policy and some structural and environmental variables at the State level has been examined. Cox and Harrell (1969) studied the impact of Federal programming on State planning and coordination. Fenkse et al (1975) assessed the impact of student assistance programs on access and choice. Title III programs have been studied by Hodgkinson (1974), and more recently Weathersby et al (1977) researched the impact of four areas of Federal intervention through the developing institution programs. The relation of accreditation and program evaluation to Federal aid has also been investigated.

Topic 4 focuses on the effectiveness of Federal programs.

Research Guidance

The section on Finance Issues offers one research design for this type of research under the heading, "Incentives and Disincentives for Financing Post-

secondary Education Arising from the Multiple Nature of Sources." Some researchers, however, prefer a time series as opposed to a cross-sectional approach. In addition to development of a comprehensive data base and statistical analysis of relationships, in-depth interviews with key State officials might be useful to gain their perceptions of the effect of annual changes in Federal funding upon State financing decisions in problem areas. This part of the investigation would focus upon whether or not State decisions actually reinforced and supplemented Federal program objectives, or counterbalanced them in the minds of key people involved.

4. THE EXTENT TO WHICH FEDERAL PROGRAMS ACCOMPLISH THEIR OBJECTIVES

Research Questions/Hypotheses

(1) What are the legislatipe goals of the major Federal programs in the area of postsecondary education?

(2) What are the operational objectives of programs implemented by Federal executive agencies?

(3) How are the impacts and effectiveness of Federal programs evaluated?

(4) What have been the impacts and effectiveness of Federal postsecondary education programs? Have they been consonant with program goals and objectives?

Problem Situation and Expected Value of Research

While a number of studies have been undertaken to assess the impact and effectiveness of selected Federal programs in postsecondary education, there appears to be no organized and comprehensive body of information on the extent to which Federal programs in this area accomplish their objectives. Many critics would argue that the Federal programs lack coherence and clarity in their objectives, and that this causes uncertainty and confusion on the part of States and institutions with respect to the Federal role.

Three types of information would be helpful to Federal, State and institutional managers in carrying out their own goal setting and planning functions:

(1) A compendium (or compendia) on the legislative intent and administrative objectives of Federal programs.

(2) Information on evaluative strategies and methods employed to assess accomplishments of Federal programs, both as employed in the past and planned for the future.

(3) Data on the historical impacts of Federal postsecondary education programs and expenditures.

The object would be to inform Federal, State, and institutional administrators of the impacts of Federal programs on postsecondary education within the last 10 years. A second objective would be to inform them of the existing systems, or lack thereof, for evaluating the extent to which Federal aid and regulatory programs actually accomplish their objectives. The project would therefore describe the nature of the concrete historical products of evaluation as well as the formal evaluation activities currently conducted by Federal agencies. It would describe, in synoposis form, the available impact/effectiveness studies as well as Federal evaluation activities. This information would assist administrators in formulating their own evaluation strategies and in assessing their own programs. This kind of information would also help in estimating the consequences of future Federal programs and expenditures.

Relevant Previous and Current Research

Periodic Commissions have outlined potential objectives and policies for higher education (Trivett,

1973). The National Commission on the Financing of Postsecondary Education (1973) identified objectives and assessed achievements. However, the impact of commissions is questioned (Longanecker and Klein, 1977). Lynn has written about restructuring HEW policies and programs (1975). Conrad and Cosand (1975) examine implications of recent Federal policy.

The growing literature on policy analysis and evaluation represents one impact of Federal policies requiring evaluation. Wholey et al (1970), Williams (1971), Rivlin (1971) and Abt (1977) report on the evaluation of social experiments and social programs with attention to methodology as well as to the programs themselves. Bernstein and Freedman (1975) evaluated the quality of Federal evaluations. The current state of the art of evaluation is presented in the *Handbook of Evaluation Research* (Guttentag and Struening 1976). Evaluation review annuals report on current research and research methodology (Glass 1976, Guttentag 1977, and Cook forthcoming 1978). Dolbear has written specifically on public policy evaluation (1975).

With respect to impacts and results, in a recent study Astin (1977a, 1977b) asserts the failure of key public policies. Evaluation of specific programs are numerous and beyond systematic discussion. The following are representative studies: manpower programs (Glennan 1969); Title I of Elementary and Secondary Education Act (McLaughlin 1974); educational performance contracting (Gramlich and Koshel 1975); student aid (Fenske et al 1975); and developing institutions (Weathersby et al 1977). Research in progress proposes to examine the organizational factors associated with the successful implementation of affirmative action programs (Tonn and Wegner 1977).

An interesting evaluative focus was employed by Wise (1977) evaluating a program from the perspective of the client to be served rather than from the viewpoint of the program or government. However, evaluation results of many programs and policies have been disappointing. There is increasing thought that "program failure" may be due as much to inadequate attention to implementation as to program design (Pressman and Wildavsky 1973, Hargrave 1975, and Williams 1975). Some are of the opinion that results are discouraging because experimental design is either inappropriate or unduly conservative.

A subject of much concern and increasing research is the question of using the results of evaluation. Weiss (1972) sketched issues and problems related to the "politics of evaluation." Berk and Rossi (1976) examine the political and moral value judgments involved in evaluation research. Using decision theory, they show how judgments can be made explicit and used in the choice of research design alternatives.

Caplan (1976) assessed the use of social research in national policy development. What constitutes "policy relevant evaluation" is addressed by Lynn (1977). Meltsner (1976) examined the political and bureaucratic factors related to the selection of problems studied by policy analysts and evaluators.

Research Guidance

The information needs require library research. Thorough library and possibly Federal agency search is required which would yield published and unpublished reports. Careful organization, summarization, and integration of materials is needed to produce a digestible body of information.

It may be that published material on evaluative strategies and methods employed by Federal agencies to assess their postsecondary education program performance is widely scattered. In that case, survey methods—including survey interviews—would probably be in order.

5. ANALYSIS OF MANAGEMENT FUNCTIONS AND ORGANIZATIONAL STRUCTURES IN POSTSECONDARY EDUCATION

Research Questions/Hypotheses

(1) Do college and university managers operate under more constraints than their counterparts in industry and government?

(2) Are lines of authority and responsibility logical, clear, and unfettered?

(3) Are assignments of function consistent with lines of formal authority and accountability?

Problem Situation and Expected Value of Research

Participants in the Keystone Conference viewed the college or university administrator as operating under a set of severe constraints. Substantial evidence exists to support this contention. The typical college or university is essentially a creation of the body politic, serving several constituencies, beset with multiple lines of authority and responsibility, and placing a high value on individual freedom and a low value on organizational efficiency. A further contention of the Keystone conferees was that the assignment of management functions to individuals and groups within the organization is not always consistent with the lines of formal authority or managerial accountability. One student of the subject relates this to the "tyranny of committees."

Empirical research documenting the constraints under which administrators operate, and the common problems in the relationship between authority structures and operating responsibilities, would provide useful information for improvement. Ideally, that type of research should be accompanied by construction of alternative models of organizational structure—including distribution of management authority and responsibility — which promise to improve the relationships between structure and process.

Relevant Previous and Current Research

Peterson reviewed the social-psychological research related to higher education administration at the institutional level (1973) and at the departmental (1976). Richman and Farmer provide a general guide to current management and organizational literature (1974).

Higher education management is addressed by Baldridge (1974). Lee and Bowen treat the management of multicampus systems (1975) and Dressel (1970) and Smart and Montgomery (1975) examine departmental management.

Research on higher education administrators (other than department chairmen) is not extensive; none appears to deal with nonacademic administration. Cohen and March (1974) and Glenny et al (1976a) have provided one of the more recent views of the presidency. Planning behavior, policymaking, and effective leadership of university executives, have been researched by Gubasta (1971) and Baldridge et al (1977). Emerging patterns of administrative accountability are identified by Browder (1971). Important concepts and approaches emerge from studies on management and organizational behavior. Mintzberg (1973, 1976) has studied the nature of managerial work. Organizational-environmental relationships, and differentiation and integration of functions in organizations have been researched by Lorsch and Lawrence (1972); they emphasize the role of managers as integrators Lawrence and Lorsch (1974).

The importance of conflict and conflict management has been noted. Scott (1973) has studied appeal systems, Strauss (1974) has examined lateral relationships, and Walton (1973) has looked at third party roles in conflict management. Pelz (1972) reviews influence as a key to effective

leadership. In an unusual treatment, Loye (1977) reviews the research and outlines a psychology of idealogy. A theory of performance evaluation and the exercise of authority has been developed by Dornbusch and Scott (1975). Decision models for higher education developed by Weathersby (1975) provide possible directions for the future.

Research Guidance

Empirical data are needed on the perceptions of executive officers, deans, and department chairpersons with respect to the authority limitations and decision processes which restrict their capacity to perform critical management functions. It would be important to control for type institution and useful to compare the common limitations found with those in industry and government. Construction of theoretical models of alternative authority structures and decision processes should be based on empirical findings of the major shortcomings of present systems. These models should serve to crystallize the organizational options open to institutions shackled by managerial constraints and mismatches among formal authority structures, operational assignment of responsibilities, and managerial accountability centers.

6. MANAGEMENT STRATEGIES FOR COPING WITH CHANGING DEMANDS AND NEEDS

Research Questions/Hypotheses

(1) Can comprehensive institutional planning address all of the major educational trade-offs as a part of the resource allocation process?

(2) What constraints should there be on plans and by whom should these constraints be established?

(3) How and by whom should educational priorities be applied to existing and proposed programs?

(4) What processes can ensure that evaluative information is used in planning, and that planning results are linked to budget decisions?

(5) What processes can keep planning current with the changing needs of society and the changing objectives of the faculty and administration?

(6) How can faculty mistrust and fear of planning (perceived as inflexible and over quantified) be overcome?

(7) What strategies can be employed to facilitate contingency planning (for such things as program elimination) while maintaining institutional morale.

Problem Situation and Expected Value of Research

Planning is the management function deliberately intended to help the organization meet changing societal demands and changing needs of the organization itself. Planning represents preparation for decisions which will have to made in the future, whether those decisions reflect changing external pressures or internal requirements. There is a growing body of literature on the planning function in postsecondary education; however, most of that literature is prescriptive rather than documentary. Much of it describes theoretical planning structures and processes which reflect untested hypotheses. Very little exists (except in the form of unpublished reports by individual institutions) to describe the actual practice of planning in colleges and universities.

More comprehensive and thorough research into the nature of actual practice is needed to evaluate the merit of the prescriptive literature, and to develop experience-based modeling of the planning

process. A number of institutions which have attempted to apply planning paradigms in the prescriptive literature have found those paradigms wanting in important respects.

Relevant Previous and Current Research

Conceptual models and approaches to planning come from a variety of sources. A general facet design model of a planning process has been developed by Dror (1968). A corporate model (Steiner 1969) and an operational planning system have been outlined by Cleland and King (1972). An emergement learning approach to planning is also set forth (Michael 1976). Higher education approaches include Schroeder (1975), Walter et al (1976), and Fuller (1976).

Empirical research efforts on national planning were assessed by Gross (1965) using analytic-descriptive (but not prescription) generalizations. He concludes, for example, that the perception of crisis is usually necessary but not sufficient for the emergence of planning. Wilson (1974) has outlined a four-factor approach to forecasting and planning: economic; social; political; and technological. Thomas (1976) investigates environmental analysis for corporate planning.

Closely linked to planning models are various models of decisionmaking: Helsabeck (1973); Sluflebeam et al (1971); Schmidltein (1974); Cohen and March (1974) and Weathersby (1975). Using marketing techniques, Morris (1974) has developed an approach to higher education planning and decisionmaking.

Outside of the prescriptive literature, most efforts consist of case studies at single institutions, for example (Maeder et al 1971, Ladd 1970). A study by Palola and Padgett (1971) surveys planning experiences at several institutions. Impacts of planing activities at five major research institutions are being studied by Poulton (research in progress 1977). Hopkins and Massey (1977) and Wehrung et al (1977) describe the long-range planning and budgeting process used at Stanford. Other budget-related items have been covered in Topic 2.

Development of information systems and techniques for planning are of importance as supports to the process. Quantitative and analytical approaches to planning and management are surveyed and explicated by Hopkins (1977), and Lawrence and Service (1977). Assessments of computer-based systems were carried out by Dresch (1975) and Mason (1976). Case studies of implementations of National Center for Higher Education Management planning products were conducted by Evans (1972), and Service and Schoemer (1977).

An information processing model of organizations is outlined by Galbraith (1972, 1977). Strauss (1975) provides one view of information systems for planning, Lawler and Rhode (1976) cover the subject of information control in organizations.

Other approaches to organizational change are worth noting. Franklin (1973) has compiled an annotated bibliography of organizational development. Kessel (1971) formulates an open system and organizational development approach for higher education. Havelock (1971) outlines approaches to innovation and change through the dissemination and utilization of planning. Rothman (1974) has codified social science research findings and translated them into applied guidelines for planning and organizing for social change.

Research Guidance

Both case studies and survey research are needed to describe current planning practices in postsecondary education, particularly as these practices reveal strategies for coping with changing demands and needs. In addition, conceptual work is needed to relate differences between prevailing practice and the major precepts of institutional planning as de-

scribed in the literature on the subject. Finally, some assessment is needed of the extent to which differences reflect shortcomings in planning theory versus planning practice.

7. EFFECTS OF EXISTING FINANCING CONSTRAINTS AND INCENTIVES ON MANAGEMENT OPTIONS

Research Questions/Hypotheses

(1) What are the prevailing financial constraints on management options?

(2) What are the sources of financial constraints and incentives?

(3) How effective are these sources in influencing management choices?

Problem Situation and Expected Value of Research

The discussion which gave rise to this topic at the Keystone Conference focused on the constraints and incentives inherent in State funding formulas for higher education. An increasing number of States are adopting funding formulas to allocate monies among postsecondary institutions. Presumably, the objectives are to bring greater rationality, equity, and efficiency to these allocations. However, institutions often complain that the formulas are crude and inflexible, and impose restrictions on the institutions which are antithetical to cost-effective management. Use of formula funding at the State level has both advantages and disadvantages, but few studies have attempted to analyze these across a number of States and institutions. The combination of incentives provided by funding formulas, and the reactive strategies of management to maximize institutional resources under formula funding, deserves closer scrutiny. These strategies will be especially pertinent as the Nation moves into a decade of declining population in the traditional college age groups. The majority of State formulas includes student enrollment as the primary driving variable.

Other financing provisions at the Federal and State levels are sources of both constraint and incentive to institutional management. Student financial aid and Title III programs represent obvious examples. For private institutions, contraints and incentives arising from private sector giving play a critical role in management options.

The primary value of this type of research lies in the information it would impart to policymakers in agencies funding postsecondary education.

Relevant Previous and Current Research

The baseline analysis of formula funding was conducted by Miller (1964). Gross (1973) carried out a comparative analysis of formulas across a number of States. More recently, Meisinger (1976) has done an extensive study of the creation and use of formula budgeting in three States. Boutwell (1973) examines formula budgeting in a situation of decline.

Reports from the State budgeting series of the Center for Research and Development in Higher Education contribute to the understanding of the State-institutional budgeting process and environment (Bowen et al 1976a, 1976b; Glenny et al 1976a, 1976b; Purves et al 1976; and Schmidltein et al 1976).

Other literature has been covered under Topics 3 and 4. Dougherty (1977), Hale and Palley (1977), and Ferman (1977) have research in progress regarding responses to financial constraints. The National Commission on Financing Postsecondary Education (1973) examined forms and methods of local, State, Federal and private support,

and assessed options. In other areas, Weathersby et al (1977) studied aspects of the Title III Developing Institutions Program, considering three areas of intervention and impact: structural development; level of activities; and relative efficiency.

Use of incentives has been addressed by Hoenack (1977), Hoenack and Norman (1974), Hoenack et al (1974) and by Levine (1972).

Research Guidance

This topic is related to Topics 3 and 4; it is defined to treat only the effects of *financing* constraints and incentives. Presumably, survey research techniques could be employed to collect broad-based information about the impact of State, Federal, and private sector financing mechanisms on the options of institutional management. However, the subject of contraints and incentives is abstract and elusive. In-depth case studies and interview samples would be necessary to validate less penetrating survey results; it would be imperative to control by type of institution.

8. IMPLICATIONS FOR MANAGEMENT OF CURRENT RELATIONSHIPS BETWEEN POSTSECONDARY EDUCATION AND THE GENERAL PUBLIC

Research Questions/Hypotheses

(1) What are the current relationships between postsecondary education and the general public?

(2) How do these relationships affect postsecondary education and individual institutional management?

Problem Situation and Expected Value of Research

The general public no longer accepts as intrinsic the value of all of postsecondary education. The turmoil on college and university campuses during the late 1960's and early 1970's alienated a significant portion of the general public, and public confidence has not been completely restored. In addition, as the number of college graduates has increased relative to employment opportunities, the margin between earnings of college graduates and those with lesser education has narrowed. Given this situation, a large part of postsecondary education (liberal arts and general education) has suffered because of the decline in the economic value of the degree. Either the public must be convinced that the noneconomic benefits of higher education are worth the investment, or programs must be reoriented to conform more closely to public needs as the public, not the institutions, perceive them. Only the minority of postsecondary education programs, largely those with specific career orientation, appear to have obvious public favor and an expansionary future in their present form.

Research which responds to the questions of this topic would furnish individual institutions with information upon which to build their own strategies for either marketing their programs or reorienting them more closely to public preferences.

Relevant Previous and Current Research

Although there is much writing about the role of higher education in the social order, there is essentially no research. Organizational-environmental relationships are increasingly recognized as important areas of research, but little has been carried out. Wilson (1974) has identified four environmental components for planning: social; economic; technological; and political.

Public concepts of the value and cost of higher education were systematically surveyed in the 1960's (Campbell and Eckerman, 1964). Education-related items have periodically appeared in the Omnibus Survey of the Institute for Social Research at the University of Michigan. Harris and Gallup polls of 1976 indicated that education as a whole is still accorded priority for funding by the public, and that there is confidence in educational leadership. Current popular attitudes and opinions regarding higher education have been summarized and compared with research findings (Shulman, 1976).

Student attitudes and expectations have been documented by the American Council on Education surveys of freshmen. Gamson (1966) among others have examined individual and organization attitudes toward education. Accounts of institutional response and change to a variety of factors have been subject to case studies (Ladd, 1970; Reisman and Stadtman, 1973).

Two studies from elementary/secondary education are worth noting: Stanwick (1975) reports on a national survey of citizen participation, including private groups concerned with educational policy and practice; Stutz (1976) reviews findings from several studies and develops alternative models of community participation. Concerned with planning and organizing for social changes, Rothman (1974) has reviewed social science research and outlined applied guidelines.

At the institutional level, models and systems for incorporating opinion surveys have been developed (Pollay 1976, Wehrung et al 1976) and might be extended into the public sector. Market analysis is being used much more extensively in higher education; Kotler (1975) addresses issues and techniques for marketing in the nonprofit sector.

Research Guidance

More studies are needed which profile public attitudes toward postsecondary education. These should be periodic, to provide longitudinal data on changes in attitudes and preference. Comparative studies of the similarities and differences between public preferences for postsecondary education and preferences of the educational community itself are needed. From these similarities and differences, studies of the policy implications for institutional management could be constructed.

Case studies of "dramatically successful" adaptation by institutions to public needs and demands would be useful, as would case studies of institutions "dramatically successful" in generating public support for their existing programs. In both types of cases, an analysis of the "exchange relationships" between the institution and its public would be illuminating.

9. DEVELOPMENT OF COMMON-CORE DATA FOR DECISIONMAKING, AND INDICATORS THAT WILL IDENTIFY THE STATUS OF AN INSTITUTION, THE TRENDS WITHIN IT, AND TRENDS IN EXTERNAL INFLUENCING FACTORS

Research Questions/Hypotheses

(1) Is there a limited set of data so useful in postsecondary education decisionmaking that it can be regarded as the common core of the management information system?

(2) Are there data sets which might be considered common core for large subsets of institutions, such as 2-year versus 4-year, or public versus private?

(3) What is the experience of institutions which

have implemented standardized information sets, such as those required in the National Center for Higher Education Management System (NCHEMS) Information Exchange Procedures?

(4) To what extent are Higher Education General Information Survey (HEGIS) data construed as common core data by various types of users?

(5) Is there a consensus among users as to which data elements are most useful, or form a common core for management purposes?

(6) If a potential common core exists, how might it be identified and developed?

(7) What are the indicators of the current economic health of a postsecondary institution?

(8) What are the indicators of the quality of the institution's educational processes?

(9) How can professional consensus be obtained on indicators, so that they are accepted as bases for action?

(10) What are the indicators of future change in an institution's environment?

Problem Situation and Expected Value of Research

Investigation into the kinds of data and data systems needed by postsecondary education management has been extensive. Substantial data systems are currently under development by NCHEMS and other organizations. These efforts have raised the question of whether or not it would be possible to devise a limited set of management data which would fulfill the essential information needs of management in most institutions. The idea has both supporters and detractors. Supporters argue that it is possible, and that development of such a data set and system for generating it would obviate the waste of an institution operating alone in this respect. Detractors claim that the diversity of institutions, institutional environments, management problems, and management styles preclude extensive use of common core data by a large number of institutions.

The primary value of research in this area would result from further delineation of the extent to which institutions share the same management problems, perceive the same data needs, and *would utilize* the same types of information in their decision-making were the information available to them.

Analytical development of indicators for use in management is in a rudimentary state. Only within the past 5 or 6 years has serious work on the subject taken hold, probably because the future effects of continued inflation and changing birth rates have become so obvious. Most colleges and universities do not employ systematic means for assessing the health of the institution beyond an annual accounting of enrollments, revenues and expenditures. Although many have attempted recently to diagnose the future environment within which the institution will be operating, that diagnosis has been largely restricted to estimates of enrollments and inflation rates.

Part of the problem stems from the complacency created by the long period of growth from 1950 to 1970, and part from the difficulty of coming to agreement on which indicators are valid and reliable.

Valid and reliable indicators would make a significant contribution to institutional management in its attempt to adapt to changing conditions with a minimum waste of misdirected energies and resources. In view of the accelerating rate of change facing postsecondary education, and the presumed need for retrenchment and redirection on the part of many institutions, research on indicators represents a most timely area of investigation.

Relevant Previous and Current Research

One view of what constitutes "basic" data from an institutional perspective has been set forth (Saupe, 1971). The Information Exchange Project

and related efforts of NCHEMS have outlined other views of relevant institutional data. Strauss (1975) and Skelton (1973) among others have examined future information system needs and alternative ways of organizing computing. Other NCHEMS projects focus on the development of State-level information bases, State planning systems, and more recently on the development of a Federal-level information base. Weathersby (1976) and Fife (1974) identified national and computerized data bases which are available, and Hofferbert and Clubb (1977) have examined the application and use of social science archives.

Anthony (1965) has developed a conceptual framework that is useful in identifying information requirements for different types of management activity: strategic planning; management control; and operational control. As noted in Topic 1, there are issues related to authority and control in the various education sectors, as well as questions related to data, at the institutional level (Chaney et al 1976).

Recent studies (Mann et al 1975, Adams et al 1976) indicate that most developments to date have been at the operational level, oriented to student and financial data. Barak (1974) and Purves and Glenny (1976) report on the status of information bases and systems development at the State level. Mosmann (1974) and Heydinger and Norris (1977) have examined Statewide computer systems and networking. Dresch (1975) and Mason (1976) among others have assessed computer based models and systems.

Huff and Young (1974) have provided profiles of uses of management information. A group of major research universities is now testing the applicability of the NCHEMS Information Exchange Project for that type of institution. Harris (1973) and Mims and Lelong (1976) report on some of the practical problems of information exchange. Michael (1976) reviews how conventional organizational structures resist the requirement for information sharing.

There have been a number of recent efforts to develop financial indicators: Anderson 1977, Bowen and Minter (1975, 1976, 1977), Lupton et al (1976), National Commission on Financing Post Secondary Education (1973), Cheit (1971, 1973), and Van Alystyne and Coldren (1976). Robinson (1976) and Jenny (1977) stress the need to include nonfinancial indicators, and point up the need for further research and interpretation for clarity and understanding.

A recent Education Testing Service Conference (1975) was devoted to exploring educational indicators. Clark et al (1976) researched dimensions of quality in doctoral education. Norris et al (1977) address manpower planning studies in postsecondary education. A survey-guided approach to organizational development is outlined by Bowers and Franklin (1977).

Program measures and outcome measures have been identified and instruments developed through NCHEMS projects. Other instruments such as the Institutional Goals Inventory and Institutional Functioning Inventory have been developed by ETS. Quantification and use of data are discussed in Lawrence and Service (1977). The development and use of social indicators are treated by Bauer (1966, and in an issue of *Evaluation* 1972). A critique of the use of social indicators is presented by Francis (1973), a summary of a larger HEW report. Weathersby (1976) and Fife (1974) summarize the availability of data in large-scale data bases; while Hofferbert and Clubb (1977) examine the potential of social science archives.

Research Guidance

Evaluation studies of institutions which have implemented such informational tools as CAMPUS and Resource Requirements Prediction Model (RRPM) would be useful. Dependent variables in such studies might be:

(1) Original reasons for implementation.

(2) Extent to which the tool was modified for institutional use.

(3) Cost.

(4) Impact on decisionmaking.

(5) Perceptions of overall value.

More general surveys to identify types of data most frequently regarded as useful in decisionmaking, by type of decision to be made, would also be helpful. Survey research, to measure the extent of agreement among administrators as to what the most important management problems are, and the priority ranking among them, would be similarly useful. Careful control for type of institution and administrator would, of course, be important.

Specific indicators for diagnosis of the present health and future vitality of postsecondary education are numerous. However, there is a need for work in several broad areas:

(1) Further analysis of the relationship between labor force requirements and the demand for postsecondary education.

(2) Other factors presumed to have a causal relationship with postsecondary enrollments.

(3) Indicators of research and service demands upon postsecondary education.

(4) Indicators of the full economic health of an institution, going beyond current revenues and expenditures to include recent and expected changes in capital values.

In addition, investigation into means of developing professional consensus on, and acceptance of, selected indicators would help to increase the use of this type of management tool.

10. INFORMATION NEEDED FOR FEDERAL AND STATE PLANNING

Research Questions/Hypotheses

(1) What kinds of postsecondary education information are needed by Federal and State agencies for program evaluation, program monitoring and administrative control, and policy analysis?

(2) What kinds of information are now available to these agencies?

(3) What is the variance between the information available and that critically needed?

(4) What use is made of the data by Federal and State agencies, and for what purposes?

Problem Situation and Expected Value of Research

The National Center for Educational Statistics (NCES) appears to achieve little interaction between assessment of analytical needs and data collection decisions (e.g., relative to the Bureau of Economic Analysis in the Department of Commerce). NCES is only illustrative of a problem which exists in many State-level agencies which also collect information on postsecondary education. Data are collected with little recourse to a carefully conceived theory, model, or rationale for use.

Generation and use of information in postsecondary education, as in most other settings, represents a challenge. Research suggested by the questions and problems outlined herein can approach the need to better understanding of information requirements, transmission, uses, cost-benefit limitations and the interrelationships involved.

Relevant Previous and Current Research

Identification of information needed for planning at the State and Federal levels is linked closely with questions of differential authority and responsibility (addressed in Topic 1), and with identification of areas or subjects of planning. Chaney et al (1976) address some of the issues.

National Center for Higher Education Management Systems (NCHEMS) projects have attempted to develop State-level information bases and have given attention more recently to Federal-level information needs. Barak (1974) and Mann et al (1975) surveyed the status of information system development and use. Purves and Glenny (1976) have studied information systems and analyses at the State level. Lawrence and Service (1977) review broader issues of quantitative approaches to higher education management.

Dresch (1975) and Mason (1976) assess computer-based models for higher education. Heim (1975) has examined the impact of NCHEMS on its constituency Chabotar and Zelan (1976) propose a more comprehensive plan for evaluating the impact of NCHEMS. Several research efforts have implications for State planning. A study of State officials and higher education has been conducted by Eulau and Quinley (1970) and Quinn (1972) reports on the goals of Massachusetts as perceived and preferred by major decisionmakers.

Weathersby (1976) summarized the availability of large-scale data bases, and Hofferbert and Clubb (1977) examine the applications and potential of social science data archives. Questions surround the analysis and use of information beyond questions of identification and collection. Caplan (1976) has studied use of data in policymaking at the Federal level. What constitutes relevant policy analysis for higher education at the Federal level is discussed by Lynn (1977).

Of more theoretical and conceptual interest, Wilson (1974) has identified four environment planning sectors: social; political; technological; and economic. Galbraith (1972) developed an information processing model of organizations which acknowledges the role of hierarchical authority and planning.

Research Guidance

The kinds of research which might be undertaken are many. One is a survey of the perceived information needs of selected Federal and State agencies, as well as an assessment of the purposes for which they need it. Another is a study of evaluative uses of information by these agencies. On the supply side, NCES collects a large volume of data from postsecondary institutions for primary use by Federal agencies and Congress, as well as for use by States and others in the educational community. The adequacy and actual use of these data in Federal planning and evaluation activities apparently has not been examined in detail. Hours of labor and other institutional resources are devoted to generating this information, and additional hours and resources are devoted by NCES to processing and analyzing these data. In view of these expenditures, an assessment is needed of the actual use and adequacy of this information.

A comprehensive review and case studies of the cost and benefits of information now supplied to selected State agencies might help to put this topic into better perspective, and help to answer some questions about the links between information and decision processes.

Another potentially profitable course of investigation would call for three sample surveys, at the Federal, State, and institutional levels respectively, to assess what educational program managers perceive as their most crucial management information needs. These surveys would cast questions into the follow-

ing six types of information to determine which areas of information systems development deserve the most attention at each of the three levels.

Time Frame	Organizational Frame	
past	internal	external
present	internal	external
future	internal	external

Whether or not it is possible to identify a common core of data which would be crucial to a large group of education managers at Federal, State, or institutional levels, is open to question. It may be that the most useful information is problem-specific; that appears to be the evolutionary experience of NCHEMS and other agencies struggling with management information problems. Many more than three surveys, focused on more specific groups of postsecondary education managers, might be necessary. Surveys of this type should make it possible to identify the largest gaps and the most crucial areas of need. It might be necessary to make these inquiries by management function, such as operational control, resource acquisition planning, or budget planning.

11. INFORMATION FOR MANAGERS ON PUBLIC ATTITUDES TOWARD POSTSECONDARY EDUCATION

Research Questions/Hypotheses

(1) What are the general and continuing areas of public interest in postsecondary education?

(2) How can institutional managers gauge the understanding and attitudes of the public on general issues or specific local issues?

(3) How can more information be gathered and kept current at reasonable cost?

Problem Situation and Expected Value of Research

There is overlap between this topic and Topic 8. As suggested under Topic 8, college administrators typically have little more than their own personal sampling of information about public perceptions and attitudes toward the college and its operations. In establishing institutional policies and deciding important issues, managers need more comprehensive and reliable data on the perceptions and attitudes of their public constituents. Ad hoc surveys of many kinds have been undertaken by institutions, but for the most part each institution begins anew. Most ad hoc surveys could be improved through development of professionally-designed instruments which lend themselves to adaptation by individual institutions. Development of a comprehensive set of sophisticated and well-tested survey research instruments which could provide this kind of information can hardly be borne by a single college or university. Neither is any national sample of public understanding and attitudes within the means of one or a few institutions.

The ultimate purpose of collecting this type of information would be to provide colleges and universities with a more complete and objective picture of the constituent views which make up the institutional environment on a given set of educational issues. Use of such data would assist managers both in policy formulation and in specific decisions, by making them better informed in critical areas of the institution's impact upon its publics. Better knowledge of dominant constituent attitudes can also assist in developing more appropriate national and

State policies, both to accommodate to public attitudes and to seek to influence them. Corporate and Federal policymakers have used this type of information in their planning, but the practice is not yet common in education.

Relevant Previous and Current Research

The need for social information regarding attitudes and behavior has been identified by Wilson (1974) as a vital component of planning and forecasting.

Attitudes toward the cost and value of higher education were identified in the 1960's (Campbell and Eckerman, 1964) and the impacts of a college degree assessed by Withey (1971). Popular attitudes and research findings have been compared (Shulman, 1976).

The development and use of social and educational indicators has been advanced by many (Bauer 1966, ETS 1975, *Evaluation* 1972) but questioned by some (Francis 1973). A survey-based approach to organizational development is outlined by Bowers and Franklin (1977). Marketing techniques for non-profit institutions, increasingly used in higher education, are set forth by Kotler (1975). Assessments of availability and use of management data (Adams and Schroeder 1976) reveal very little use of public information.

From the public school sector, Campbell (1976) and Stanwick (1975) report on alternative models for citizen and community participation in policymaking and decision making. Goals of major higher education and government decisionmakers in Massachusetts have been identified and compared (Quinn 1972). Rothman (1974) has summarized social research findings and articulated action guidelines for planning and organizing for social change; many community-public guidelines are identified.

Research Guidance

At the broadest level, national sample surveys might be designed and implemented to repeat past inquiries of various times and types in an attempt to identify the long-term, recurrent, general areas of public interest in postsecondary education. Prototype survey instruments might be designed for periodic use in ascertaining national attitudes on postsecondary topics, so that the actual subjects of the attitudes could be changed from one administration of the survey to the next.

At the institutional level, an attempt might be made to collect and analyze available institutionally-administered survey instruments in each identified area of enduring public interest. On the basis of this analysis, specialized prototype survey research instruments could be developed for institutional use, with recognition that the prototype would be modified by the individual institution according to its own specific needs. Finally, each instrument might be tested through application in about 10 colleges or universities, and revised as necessary.

Projects in this area should be designed to make professionally prepared instruments available to the individual college or university at low cost and actual information through national level data collection.

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